MAG Regional Aviation System Plan Update
Draft Working Paper #4
Summary of Major Items for Each Alternative

Alternative	Major Items
Status Quo	*Currently programmed projects:* Runway extensions – Buckeye, Glendale, Wickenburg
Improved Technology	*Improved approaches to afford additional operating capacity:* Most expected improvement – Phoenix Sky Harbor, Williams Gateway, Scottsdale
Maximized Airport Development	*Expand airports with capacity constraints and upgrades:* Buckeye – longer runway, precision approach Chandler – longer runway, precision approach Glendale – longer runway, precision approach Memorial – restoration, new taxiway, nonprecision approach Mesa – precision approach Phoenix-Deer Valley – parallel runway, precision approach Phoenix-Goodyear – parallel runway, precision approach Phoenix-Sky Harbor – 4th runway, precision approach, addt'l terminal Pleasant Valley – pave runway & parallel taxiway, nonprecision approach Scottsdale – addt'l parallel taxiway, precision approach Wickenburg – longer runway, nonprecision approach Williams Gateway – longer runway, precision approach, addt'l term space
New Airport Development	*GA:* Peoria/Pleasant Valley Wickenburg/Forepaugh New – south/southeast search area (south of Chandler) New – northeast search area (northeast of Scottsdale) *Commercial:* Expand Williams Gateway New – north search area (studied by City of Phoenix) New – south search area (studied by ADOT – RAFA)

Source: Wilbur Smith Associates, July 2002

The demand capacity and facility requirements analysis presented in Working Paper No. 3 revealed that the existing MAG aviation system will experience deficiencies in its ability to accommodate projected aviation demand through 2025. Existing airport facilities, as identified in Working Paper Number One - Inventory, were compared to FAA criteria contained in Advisory Circulars 150/5060-5, "Airport Capacity and Delay" and 150/5300-13, (with changes) "Airport Design" to identify the ability of the existing airport system to accommodate future demand. Deficiencies were identified at various airports in each of the subcategories of the Airside Capacity and Facility Requirements.

Each airport's airside and landside components were compared to the criteria contained in the referenced FAA Advisory Circulars. Airfield capacity identified for each respective airport was compared to the airport-specific activity projections contained in Working Paper Number Two - Aviation Demand Forecasts. Individual airfield (runways - length and width, taxiways - full, partial, none and width, etc.) and landside components were compared to the criteria established by the FAA for each respective Airport Reference Code (ARC). The analysis conducted in previous elements has focused on each airport's existing facilities and ARC. As part of the alternatives development, changes to airport ARCs will be evaluated, as well as improved facilities to meet the identified ARCs. For those airports not included in the National Plan of Integrated Airport Systems (NPIAS), the alternatives will address possible inclusion and the ability of the airports to meet federal development standards based on ARCs.

SUMMARY OF FACILITY DEFICIENCIES

The following summarizes the deficiencies identified in the previous chapter.

Airside Capacity

Airside capacity establishes the ability of the existing airfield facilities (runway and taxiway) to accommodate projected aviation activity demand. Airport capacity is measured in terms of annual service volume (ASV), aircraft delays, and hourly capacities.

Annual service volume is defined as an estimate of an airport's annual operating capacity, which represents its ability to process aircraft activity on a continual basis. As noted previously, aircraft delays increase rapidly, with relatively small increases in aircraft activity, as annual aircraft operations approach an airport's ASV.

For system planning purposes, FAA recommends that planning for additional capacity begin when annual operations reach 60 percent of ASV, under normal conditions. Additional capacity should be available when the number of annual operations equals approximately 80 percent of ASV. Additional capacity is typically provided through airfield improvements such as parallel runways or taxiways. Capacity saturation can also be addressed through methods of demand management.

Ten of the MAG system airports will exceed the 60 percent threshold during the course of the planning period. Eight of these 10 airports will achieve or exceed the 80 percent threshold, when FAA recommends that additional facilities be in place to accommodate projected demand. The airports and the projected ratio of demand to annual service volume for 2025 are:

- Buckeye Municipal ---------- 68%
- Chandler Municipal ---------- 112%

- Glendale Municipal ---------- 76%
- Mesa Falcon Field ---------- 107%
- Phoenix-Deer Valley ---------- 106%
- Phoenix-Goodyear ---------- 110%
- Phoenix-Sky Harbor ---------- 110% - 135%
- Pleasant Valley ---------- 112%
- Scottsdale ---------- 131%
- Williams Gateway ---------- 103%

Figure 4.1 represents a graphic illustration of the respective airports existing annual service volume versus projected 2025 annual operations. It is important to note that airports can operate at more than 100 percent of their ASV but that it is likely that aircraft operating at the airports can experience a range of delay, depending upon activity experienced at the airports during peak periods.

For large commercial service airports such as Phoenix-Sky Harbor International, ASV does not provide a sufficient method for evaluating operational capacity. Peak hour operations must be considered at large commercial service airports. The nature of commercial passenger operations results in airlines scheduling banks of flights during peak periods of the day at an airline connecting hub such as Phoenix. Airlines attempt to schedule operations during periods when passengers are most inclined to travel, particularly business travelers.

The FAA capacity benchmarks for peak hour capacity at Sky-Harbor have been calculated at between 137 and 146 operations per hour (the higher number represents optimum operating conditions, which FAA indicates are optimistic). Using the lower peak hour capacity level of 137 operations per hour results in the following demand to capacity ratios:

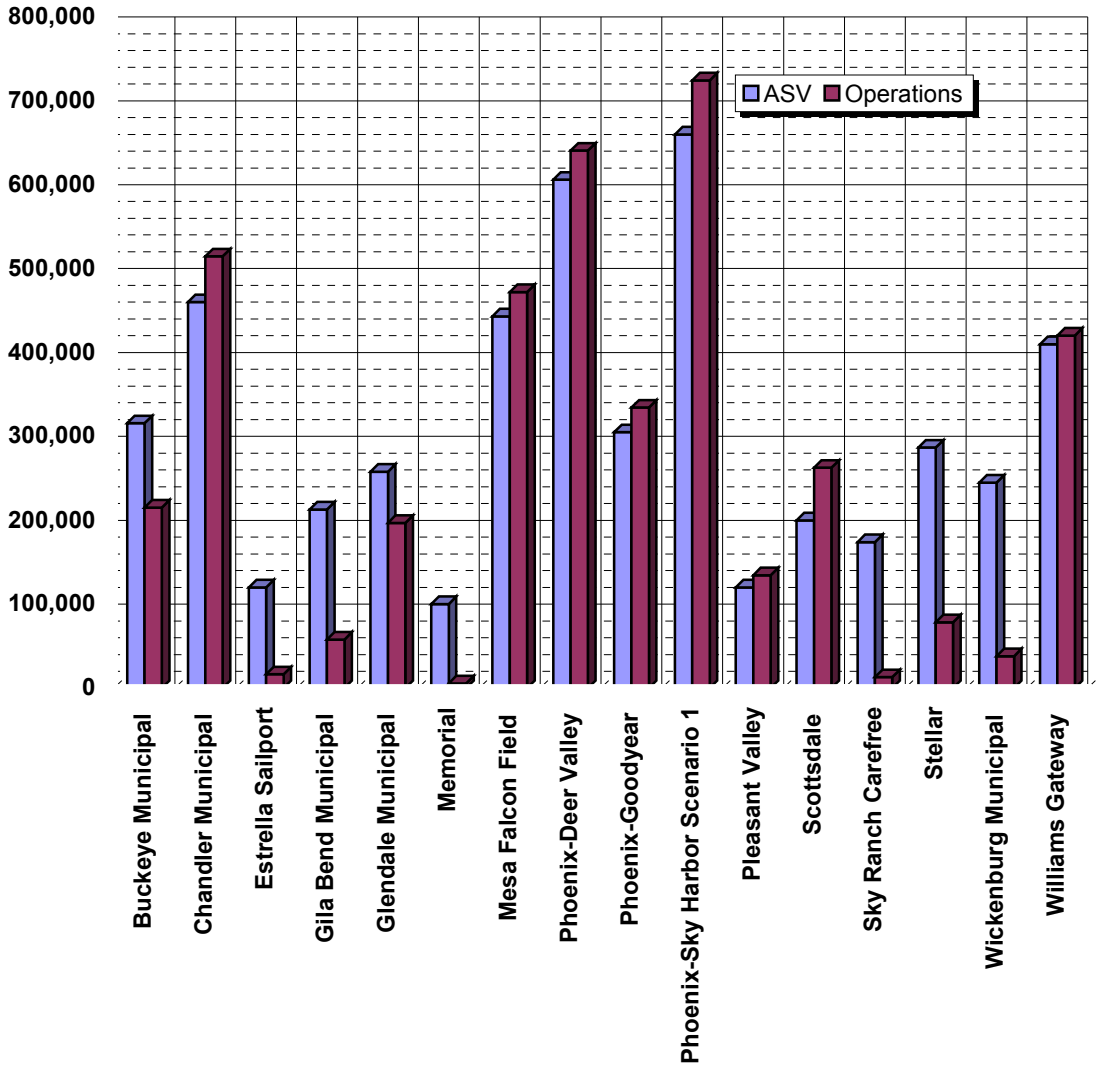
Sky Harbor Peak Hour Demand/Capacity

- 2005 ---------- 109 – 116%
- 2015 ---------- 118 - 134%
- 2025 ---------- 127 - 156%

For the RASP, the 60 and 80 percent benchmarks used by the FAA for general planning purposes were used to determine those airports that have operational capacity issues. For those airports that are projected to operate over 60 percent but under 80 percent of operational capacity in 2025, enhancements such as taxiway improvements and the ability to construct a parallel runway were examined. If the airport was not projected to surpass the 80 percent benchmark, a parallel runway was not identified for construction during the planning period, but was recommended for inclusion on an airport layout plan in the post-planning period. By identifying the runway as a potential, even beyond the planning period, the land for the potential runway can be reserved and facilities built around the potential runway.

For those airports projected to surpass the 80 percent benchmark by 2025, the ability of the airport to address operational capacity through taxiway improvements or a parallel runway was examined.

Figure 4.1
Annual Service Volume vs. Projected Operations



Source: Wilbur Smith Associates, Inc.

Runway Length

Recommended primary runway lengths were calculated based on the FAA Airport Design computer software program. MAG system airports, for the most part, provide the primary runway length recommended by FAA to accommodate the aircraft projected to use these facilities during the study period. The primary runway lengths at Pleasant Valley, Stellar Airpark and Williams Gateway Airport do not meet the FAA recommended lengths. The existing and recommended runway lengths for each of the three airports not currently meeting the FAA recommended minimums for the existing airport ARCs are as follows:

	EXISTING	RECOMMENDED
• Pleasant Valley	3,657 feet	3,800 feet
• Stellar Airpark	4,005 feet	4,400 feet
• Williams Gateway	9,305 feet	11,000 feet

It is important to note that both Pleasant Valley and Stellar are not included in the National Plan of Integrated Airport Systems (NPIAS) and are not required to meet FAA standards.

Runway Width

Recommended primary runway widths, as with runway lengths, were calculated using the FAA Airport Design computer software program for the existing airport ARCs. Three MAG system airports currently have existing primary runway widths less than the FAA recommended minimum, as follows:

	EXISTING	RECOMMENDED
• Estrella Sailport	50 feet	60 feet
• Sky Ranch Carefree	50 feet	60 feet
• Stellar Airpark	60 feet	75 feet

All three of these airports are not included in the NPIAS and are not required to meet FAA standards.

Runway Strength

Four of the MAG system airports do not meet the FAA recommended minimum runway strength requirements. The airports and the existing and recommended runway strengths are:

	EXISTING	RECOMMENDED
• Buckeye Municipal	12,500 S.W	30,000 S.W.
• Gila Bend Municipal	12,500 S.W	30,000 S.W.
• Memorial	N.A.	60,000 D.W.
• Pleasant Valley	N.A.	12,500 S.W.

The runway strength of Memorial is not available. It has been noted that the existing pavement at Memorial is in disrepair. Pleasant Valley has a dirt runway, which is not rated for strength.

Runway-Taxiway Separation

FAA has established runway to taxiway separation criteria for airports with parallel taxiways based on the ARC of each airport. The runway to taxiway separation ranges from a minimum recommended distance of 150 feet at the lowest activity airports accommodating small aircraft only, up to 600 feet at airports accommodating the largest aircraft in the fleet. Two system airports, Estrella Sailport and Pleasant Valley, do not have parallel taxiways. Five of the remaining system airports do not meet the FAA recommended minimum runway to taxiway separation. The following summarizes the airports with primary runway to taxiway separations that do not meet FAA recommended minimums:

- Gila Bend Municipal – Deficient
- Glendale Municipal – Deficient/Modification
- Mesa Falcon Field – Deficient/Modification
- Scottsdale – Deficient/Modification
- Wickenburg Municipal – Deficient

Three of these five airports have modifications to design standards from the FAA that allow for the deficiency. If these airports are improved, these modifications will likely need to be addressed and the deficiencies corrected.

Taxiway Requirements

Parallel taxiways improve airfield operating efficiency and thus enhance airport capacity and provide increased airfield safety. The availability of a parallel taxiway enables aircraft to enter and exit the runway expeditiously and increases airfield safety by eliminating the need for aircraft to taxi on the runway. The NPIAS guidelines identify parallel taxiways as a fundamental airport development item. That is, the FAA has determined the availability of a parallel taxiway is a necessary component to the operation of NPIAS airports. Four of the existing MAG system airports either have no parallel taxiway or a partial parallel taxiway. These airports and the status of their taxiway system to meet existing airport ARCs are as follows:

- Estrella Sailport ---------- No Parallel
- Gila Bend Municipal ---------- Partial Parallel
- Pleasant Valley ---------- No Parallel
- Williams Gateway ---------- Partial Parallel

Two of these airports (Estrella and Pleasant Valley) are not included in the NPIAS.

Navigational/Lighting Aids

Navigational/lighting aids provide additional capabilities for pilots operating in low visibility conditions and at night. The MAG region incurs limited low visibility conditions, which theoretically translates into a limited need for precision and non-precision instrument approach capabilities. Currently Phoenix-Sky Harbor International and Williams Gateway airports have full precision instrument (ILS) capabilities. The volume of aviation activity in the MAG Region, in addition to the significant amount of training activity, would indicate a need for additional instrument approach capabilities at airports in the Region.

Instrument training activity at Phoenix-Sky Harbor International is largely impractical due to the incompatibilities of the smaller general aviation training aircraft and the large commercial aircraft. This activity places additional workload on air traffic controllers based on the high volume of existing activity at Phoenix-Sky Harbor International and the significant training that occurs in the Region.

Williams Gateway currently provides an alternative instrument training facility to Phoenix-Sky Harbor International. However, the projected growth in aviation activity at Williams Gateway during the planning period and the growing volumes of training activity throughout the MAG system can be expected to overwhelm the capabilities of Williams Gateway to handle instrument training activity throughout the duration of the planning period.

MAG system airports, as previously discussed, should provide a minimum of a lighted runway, lighted wind cone, and rotating airport beacon. One of the five system airports (Pleasant Valley) currently does not have a lighted runway is eligible for runway lighting, however this airport is not included in the NPIAS and is not eligible for federal or state funding for runway lighting.

Aircraft Storage

Aircraft storage facilities can range from T-shade type structures to T-hangars, which house a number of aircraft in groups of individual hangars that share common interior walls, and large open conventional

hangars that house a number of aircraft within one large open space, on up to large corporate hangars that typically accommodate one to three aircraft, owned by companies, in stand-alone structures built to individual specifications.

A review of existing airport land areas indicates the majority of airports within the MAG system can accommodate projected demand throughout the study period. Three system airports were identified as potentially being unable to accommodate projected aircraft storage requirements:

- Mesa Falcon Field
- Phoenix-Deer Valley
- Stellar Airpark

Commercial Space

Three airports within the MAG system are projected to provide commercial passenger service during the study period - Phoenix-Sky Harbor International, Scottsdale, and Williams Gateway. All three airports are projected to exceed their existing passenger terminal design capacity for passenger activity during the study period.

Summary of Deficiencies

Table 4.1 summarizes the respective airports projected facility deficiencies over the course of the study period based on their existing ARCs. These deficiencies will subsequently be translated into facility development alternatives identified to accommodate projected system demand. Each of the alternatives will be evaluated relative to their ability to meet a set of evaluation criteria in the next Working Paper for the study.

Table 4.1
Facility Deficiencies

Airport Name	ASV	Hourly Capacity	Runway Length	Runway Width	Runway Strength	Runway Taxiway	Taxiway Requiremts.	NAVAIDS/ Lighting	Aircraft Storage	Comm. Space
Buckeye Municipal	☐	N.A.	■	■	☐	■	■	☐	■	N.A.
Chandler Municipal	☐	N.A.	■	■	■	■	■	◘	■	N.A.
Estrella Sailport	■	N.A.	■	☐	■	■	☐	◘	■	N.A.
Gila Bend Municipal	■	N.A.	■	■	☐	☐	☐	◘	■	N.A.
Glendale Municipal	☐	N.A.	■	■	■	☐	■	◘	■	N.A.
Memorial	■	N.A.	■	■	☐	■	■	◘	■	N.A.
Mesa Falcon Field	☐	N.A.	■	■	■	☐	■	◘	◘	N.A.
Phoenix-Deer Valley	☐	N.A.	■	■	■	■	■	◘	◘	N.A.
Phoenix-Goodyear	☐	N.A.	■	■	■	■	■	◘	■	N.A.
Phoenix-Sky Harbor International	☐	☐	☐	■	■	■	■	◘	■	☐
Pleasant Valley	☐	N.A.	☐	■	☐	■	☐	■	■	N.A.
Scottsdale	☐	N.A.	■	■	■	☐	■	◘	■	☐
Sky Ranch Carefree	■	N.A.	■	☐	■	■	■	◘	■	N.A.
Stellar Airpark	■	N.A.	■	■	■	■	■	■	◘	N.A.
Wickenburg Municipal	■	N.A.	■	■	■	☐	■	◘	■	N.A.
Williams Gateway	☐	N.A.	☐	■	■	■	☐	◘	■	☐
MAG	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

■ Meets facility recommendations
☐ Does not meet facility recommendations
◘ Meets some facility recommendations
N.A. not applicable

Source: Wilbur Smith Associates

ALTERNATIVES

Four alternative scenarios have been identified for evaluation. These four alternatives are as follows:

- Status Quo
- Improved Technology
- Maximized Development of Existing System
- New Airport Development (general aviation and/or commercial service)

A description of each alternative and the implications for development is provided below.

Status Quo

The ***Status Quo*** alternative will provide a base case for comparison to other alternative scenarios. The Status Quo alternative scenario represents construction of only those development projects currently identified in the Arizona Department of Transportation Aeronautics Division's (ADOT's) current Capital Improvement Program (CIP). No additional facility development is identified in this alternative scenario, other than that required to maintain all existing and currently programmed facilities.

The ADOT CIP includes airport construction/development projects that have been identified through the year 2006. Therefore, the Status Quo scenario essentially represents the current level of airport development through the initial or short range development period, as identified in the CIP. Some development that is proposed will result in airports achieving higher ARC design standards. These changes in ARC are noted for those impacted airports. No further development is proposed through the year 2025, beyond that identified in the current ADOT CIP, for the Status Quo alternative.

In addition, this alternative assumes existing regulations, ordinances, technology, and facilities will remain in place and also assumes continued implementation of the Northwest 2000 Plan, as presently defined.

Those projects included in the current ADOT CIP for each of the MAG system airports are presented in **Table 4.2** and are discussed in the following narrative.

Table 4.2
Status Quo Summary

Airport Name	Recommended Development
Buckeye Municipal	Runway extension, Taxiway extension, Apron expansion
Chandler Municipal	Apron construction, Helipad, Land acquisition
Estrella Sailport	None
Gila Bend Municipal	Visual approach guidance installation, Airport access road construction
Glendale Municipal	Runway extension & strengthening, Taxiway extension, New Taxiway Construction (east side)
Memorial	None
Mesa Falcon Field	Taxiway Improvements, Apron construction, GA terminal building, Helipad
Phoenix-Deer Valley	Land acquisition
Phoenix – Goodyear	Fencing and ASOS
Phoenix-Sky Harbor International	
Scenario 1 Scenario 2	ARFF stations, Land acquisition, New concourses, Apron expansion, People mover
Pleasant Valley	None
Scottsdale	Land acquisition, Transient aircraft apron, Taxiway "A" extension
Sky Ranch Carefree	None
Stellar Airpark	None
Wickenburg Municipal	Runway extension, Aircraft parking apron
Williams Gateway	Air cargo apron, South tract access road, Taxiways C, H, and M extensions, Helipad

Source: Wilbur Smith Associates, Inc.

Buckeye Municipal – A number of projects are identified at Buckeye Municipal Airport in the current ADOT CIP. Specific projects include an extension of Runway 17-35 by 1,200 feet to an overall length of 5,500 feet, with an associated widening of the runway from 75 feet in width to 100 feet in width and strengthening of the entire runway pavement. This runway extension and widening will result in the airport's ARC changing from B-II to C-II. An extension of the parallel taxiway to the extended Runway 35 end is also identified with associated taxiway lighting. The PAPIs on the Runway 35 end will be relocated to the new runway end with runway end identification lights installed on both the Runway 17 and 35 ends. Additionally, the ADOT CIP includes expansion of the aircraft parking apron.

Chandler Municipal – Projects identified in the ADOT CIP for Chandler include an environmental assessment of the proposed south side apron, expansion of the Santan aircraft parking apron, acquisition of an avigation easement for the Runway 4R runway protection zone, construction of a helipad and supporting facilities, design and construction of a freeway access road to the GDS site, design and construction of an automobile parking lot to serve the GDS site and expanded Santan apron, construction of two phases of aircraft parking apron to support the GDS site, construction of an extension to the taxiway serving the GDS site with an associated widening and strengthening of the taxiway, and acquisition of approximately 30 acres of land for future north side airport development.

Estrella Sailport – No projects are identified in the current ADOT CIP for the Estrella Sailport as the airport is not eligible for public funding.

Gila Bend Municipal – Projects identified in the ADOT CIP for the Gila Bend Municipal Airport include acquisition of land in the approaches to the Runway 4 and 22 ends, design and installation of precision approach path indicators (PAPI) and REILS, and design and construction of the airport access road.

Glendale Municipal – Projects identified for Glendale Municipal Airport in the current ADOT CIP include an overall 1,800-foot extension to Runway 1-19 on both the north and south runway ends to a total length of 7,100 feet with an associated widening of the runway to a 100-foot width. The Runway 1-19 pavement will also be strengthened to 60,000 pounds. The parallel taxiway serving Runway 1-19 will also be lengthened to the extended runway ends. Perimeter fencing and the airport perimeter road will also be expanded to encompass the extended airfield. A new east side apron and parallel taxiway are programmed for construction.

Memorial - No projects are identified in the current ADOT CIP for Memorial Airport.

Mesa Falcon Field – Projects programmed for Mesa Falcon Field include construction of a perimeter road and underpass of Falcon Drive; construction of a helipad; construction of taxiway improvements, including new high-speed taxiway exits with associated lighting and signage; construction of additional aircraft parking aprons; construction of a new general aviation terminal building; and initiation of an airport planning study.

Phoenix-Deer Valley – Projects programmed for Phoenix-Deer Valley Airport include land acquisition of approximately 177.5 acres and airfield pavement maintenance – runway, taxiway, and apron areas.

Phoenix-Goodyear - Projects programmed for Phoenix-Goodyear Airport include installation of an automated surface observation system (ASOS) and initiation of a study to determine the feasibility of a new parallel runway.

Phoenix-Sky Harbor International – Projects programmed at Phoenix-Sky Harbor International Airport include a number of runway and taxiway reconstruction projects, initiation of an Environmental Impact Study for the proposed West terminal, land acquisition associated with noise mitigation efforts, projects associated with the expansion and modification of airport terminal buildings (specifically the construction of new terminal concourses T-4 and S-2), construction of additional aircraft apron areas to serve the new and expanded terminal concourses, construction of a people mover ground transportation facility (including re-alignment of Sky Harbor Boulevard), and development of infrastructure to accommodate the West terminal.

Pleasant Valley - No projects are identified in the current ADOT CIP for Pleasant Valley Airport as the airport is not currently eligible for public funding.

Scottsdale – Projects programmed for Scottsdale Airport include runway safety area improvements, land acquisition of the Keekor property (for hangar construction), construction of a transient aircraft parking apron, construction of an extension and paved shoulders to Taxiway A, engineering design of an aircraft parking apron, and development of utilities to serve the proposed hangars on the Keekor property.

Sky Ranch Carefree - No projects are identified in the current ADOT CIP for Sky Ranch-Carefree Airport as the airport is not currently eligible for public funding.

Stellar Airpark - No projects are identified in the current ADOT CIP for Stellar Airpark as the airport is not currently eligible for public funding.

Wickenburg Municipal – Projects currently programmed at Wickenburg Municipal Airport include the design and construction of extensions to Runway 5-23, with an ultimate proposed length of 7,150 feet. Construction of the lower aircraft parking apron, totaling approximately 7,700 square yards, is also programmed.

Williams Gateway - Projects currently programmed at Williams Gateway Airport include the design and construction of an air cargo apron, construction of an access road to serve the South tract, design and construction of a number of taxiway extensions, (taxiways C, H and M), installation of aircraft tiedowns, construction of a lighted helipad, and the design of taxiways N and P.

Summary of Status Quo Alternative

Under the Status Quo alternative, runway extensions are programmed at three airports (Buckeye, Glendale, and Wickenburg). These runway extensions will provide additional opportunity for larger aircraft to operate at these airports and have the potential to change the operating environment in the MAG Region. In addition to these major programmed improvements, other projects will address deficiencies identified in the previous Working Paper such as navigational aids and aircraft storage.

Table 4.3 presents the existing and projected capacities of the airports under the Status Quo alternative. The Status Quo alternative does not address the most significant need, operating capacity. Evaluation of the Status Quo alternative will focus on the results of not implementing a capacity-enhancing project in the Region.

Table 4.3
ASV Impact – Status Quo

Airport Name	Existing ASV	2025 Operations	Existing ASV to 2025 Operations Ratio	Future ASV with Committed Projects	Future ASV to 2025 Operations Ratio
Buckeye Municipal	315,560	215,200	68%	315,560	68%
Chandler Municipal	460,000	514,500	112%	460,000	112%
Estrella Sailport	120,000	16,500	14%	120,000	14%
Gila Bend Municipal	212,797	57,800	27%	212,797	27%
Glendale Municipal	257,972	197,000	76%	257,972	76%
Memorial	100,000	5,500	6%	100,000	6%
Mesa Falcon Field	443,000	472,100	107%	510,000	93%
Phoenix-Deer Valley	606,000	640,600	106%	606,000	106%
Phoenix-Goodyear	304,916	334,200	110%	304,916	110%
Phoenix-Sky Harbor International					
Scenario 1	660,000	724,400	110%	660,000	110%
Scenario 2	660,000	892,100	135%	660,000	135%
Pleasant Valley	120,000	134,300	112%	120,000	112%
Scottsdale	200,000	262,600	131%	225,000	117%
Sky Ranch Carefree	174,000	13,000	7%	174,000	7%
Stellar Airpark	286,700	78,400	27%	286,700	27%
Wickenburg Municipal	245,000	38,100	16%	245,000	16%
Williams Gateway	410,000	420,300	103%	410,000	103%

Source: Wilbur Smith Associates

Improved Technology

The ***Improved Technology*** alternative is the second alternative proposed for evaluation as part of the MAG RASP Update. During the course of the study period, the most significant deficiency within the MAG System will be operational capacity at many airports. The FAA's capacity benchmark analysis indicates there is a potential increase in operational capacity through implementation of a number of anticipated technological and procedural improvements over the next 10 years. Proposed improvements to technology will be evaluated as they relate to each airport, however, they will likely be most relevant to commercial service airports in the system (Phoenix-Sky Harbor International, Scottsdale, and Williams Gateway). This alternative assumes implementation of improved technology at MAG Region airports and will be evaluated in a subsequent Working Paper to determine its potential impact and feasibility. This alternative also assumes implementation of ADOT's current CIP for airports in the MAG Region.

Operational capacity will represent the overriding deficiency at many airports within the MAG System over the course of the study period. On-going programs and studies by FAA are evaluating the benefits technology may have in increasing airspace and airport capacity. FAA is developing the **Operational Evolution Plan (OEP)**. This plan is an on-going effort to meet U.S. air transportation needs for the next 10 years by increasing capacity and decreasing delays, while simultaneously improving safety and

security. The Airspace Capacity Enhancement Plan (ACE) provides a comprehensive discussion of proposed capacity enhancement initiatives being evaluated, many of which were formulated in the OEP. The following are a selection of the pertinent studies underway:

- Operational Evolution Plan
- Flight Management Systems (FMS) Transition to Existing Approaches
- Independent Parallel Approaches Using Precision Runway Monitor (PRM)
- Independent Parallel Approaches Using Final Monitor Aid (FMA)
- Improved Operations On Parallel Runways Separated By Less Than 2,500 Feet
- Simultaneous Offset Instrument Approach
- Automated Dependent Surveillance (ADS-B)/Cockpit Display of Traffic Information (CDTI)

It should be noted that the majority of these technological improvements apply to Instrument Flight Rules (IFR) conditions only. A brief discussion of these technology improvements is presented in the following narrative.

Operational Evolution Plan - The Operational Evolution Plan identified four core problem areas:

- Arrival/Departure Rates
- En-Route Congestion
- Airport Weather Conditions and
- En Route Severe Weather

Technical teams were established to identify methodologies to address the problem areas. The current version of the OEP - Version Four, consists of three planning horizon periods as follows:

Near-Term Plans (2002):
- *Improved precision approaches*
- *Widespread use of Free Flight tools*

Mid-Term Plans (2003-2004):
- *Optimize airspace design*
- *Reduced vertical separation*
- *Enhanced navigation procedures*

Long-Term Plans (2005-2010):
- *Data communications*
- *Satellite navigation*
- *Enhanced surveillance*

Specific strategies to address each of the core problem areas are addressed in the Plan. These include components such as new runway construction, re-designing the terminal airspace and air routes, reducing aircraft voice communications, reducing vertical separation of aircraft, maintaining runway use in reduced visibility conditions, and providing better hazardous weather data to pilots. Many of these strategies have or will be translated into elements of the ACE Plan.

Flight Management Systems (FMS) Transition to Existing Approaches - Many newer aircraft are equipped with on board Flight Management System (FMS) computers. These computers can perform a variety of navigation functions. Studies are underway to develop methodologies to use FMS capabilities to provide near-term airspace operations enhancements.

FAA is using Flight Management System computers to transition aircraft from the en route (cross-country) flight phase to visual flight procedures and ILS approaches. Full use of FMS procedures are expected to reduce minimums for charted visual flight procedures, reduce procedural and airspace conflicts; reduce controller vectoring and radio transmissions; enable controllers to maximize traffic flow; reduce aircraft fuel consumption; provide increased adherence to routings that minimize noise impacts over sensitive areas; and provide alternative arrival, departure, and missed approach procedures.

Independent Parallel Approaches Using Precision Runway Monitor (PRM) - In low visibility conditions with closely-spaced parallel runways (2,500 feet to 4,299 feet), independent parallel approaches are not possible due to the proximity of arrival paths. However, use of a Precision Runway Monitor (PRM) system provides significant capacity gains. The PRM system incorporates an improved antenna system that provides increased accuracy and higher data rates than current terminal Airport Surveillance Radar (ASR) systems. Use of the PRM system allows controllers to monitor parallel approach courses on high-resolution color displays. The system alerts controllers when an aircraft goes off-course.

Two PRM systems are available. E-SCAN uses an electronic scanning antenna that updates an aircraft's position every half-second. MODE-S uses two rotating back-to-back antennas mounted to update an aircraft's position every 2.4 seconds.

Studies of the PRM technology resulted in the publication of procedures for independent parallel approaches to runways with centerlines separated by 3,400 feet to 4,299 feet. Additional studies are underway to determine the minimum runway spacing (below 3,400 feet) for independent parallel approaches using PRM.

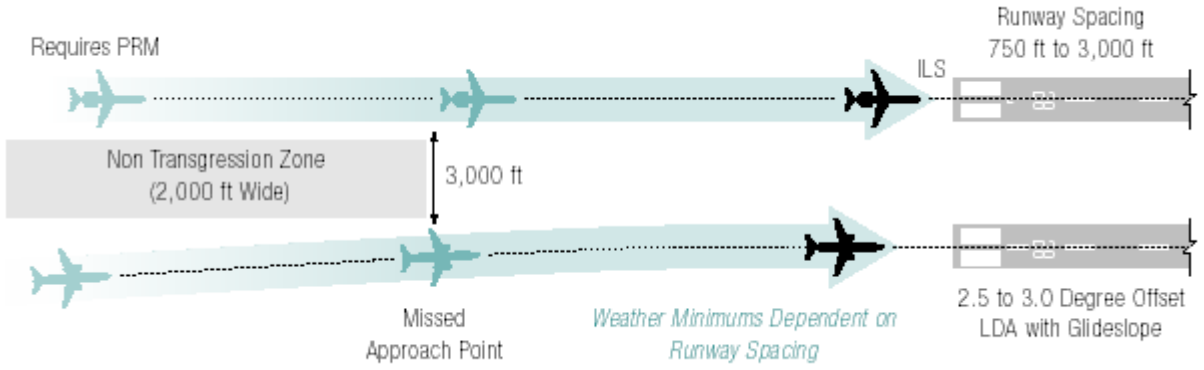
Independent Parallel Approaches Using Final Monitor Aid (FMA) - The Final Monitor Aid (FMA) is a high-resolution color display equipped with the controller alert system used in the PRM system. The FMA allows independent parallel approaches to runways separated by as little as 4,000 feet using existing radar equipment. The display provides digital mapping and incorporates alert algorithms that predict the aircraft flight track. A colored warning alert is provided to the controller either when an aircraft actually penetrates or is predicted to penetrate a specified area identified as the no transgression zone (NTZ) or if the aircraft transponder becomes inoperative.

Studies showed use of FMA with current radar systems improves controller's ability to detect off-course aircraft. This ability allowed a reduction in the minimum centerline spacing for independent parallel approaches and provided an average capacity gain of 12-17 arrivals per hour.

Improved Operations On Parallel Runways Separated By Less Than 2,500 Feet - Parallel runways separated by less than 2,500 feet are currently considered a single runway during IFR conditions due to the impacts associated with aircraft wake vortex. Aircraft in flight generate wind turbulence that can adversely affect the flight of trailing or nearby aircraft. Therefore, simultaneous arrivals and departures on separated by less than 2,500 feet during IFR conditions are prohibited, resulting in a significant capacity penalty. The FAA is studying a possible reduction in the 2,500-foot separation requirement under most meteorological conditions.

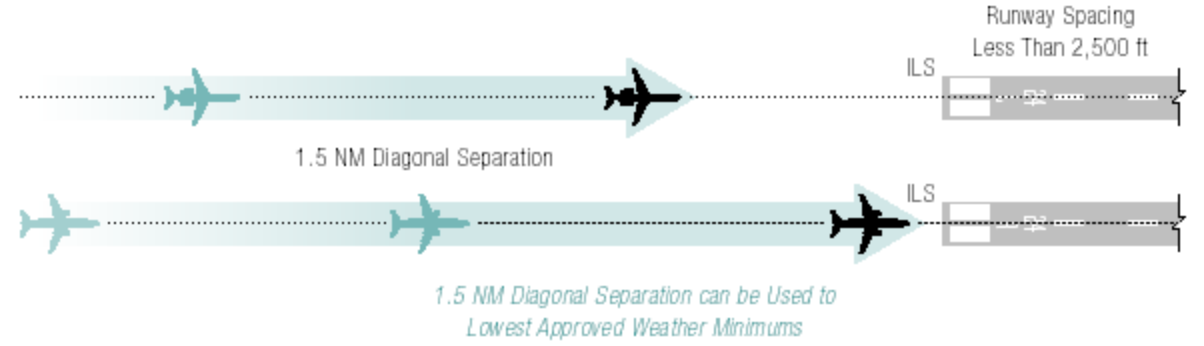
Simultaneous Offset Instrument Approach - Simultaneous Offset Instrument Approaches (SOIA) allow approaches to parallel runways spaced 750 to 3,000 feet apart. These approaches use PRM and an offset ILS localizer directional aid (LDA) with glide slope on one runway and a straight-in ILS approach on the other runway. Localizer directional aids (LDAs) are used for non-precision instrument approaches, providing the accuracy of a localizer course, while also providing flexibility in siting, since they are not aligned on the runway centerline.

Simultaneous offset instrument approaches pair aircraft along adjacent approach courses that are separated by at least 3,000 feet. A missed approach point is designated approximately 3.5 nautical miles from the runway threshold. The pilot on the offset approach flies a straight approach that is angled toward the extended runway centerline. The pilot continues descent until they are below cloud cover at which point they would make visual contact with the other aircraft. If the pilot reaches the missed approach point and has not made visual contact with the other aircraft, the approach is aborted. Simultaneous offset instrument approaches achieved average capacity gains of 12 to 18 operations per hour. The graphic



below depicts this procedure.
Source: 2001 ACE Plan

Along Track Separation - Along track separation would increase arrivals to parallel runways spaced less than 2,500 feet apart in low visibility weather. FAA initiated this study to evaluate the effects of reducing the diagonal separation of aircraft from 2 nautical miles to 1.5 nautical miles. Dependent parallel approach procedures were previously allowed if the parallel runways were separated by a minimum 2,500 feet. A minimum two nautical mile (nm) diagonal separation between aircraft was also required on adjacent approaches. Parallel dependent instrument approaches would be staggered down to 1.5 nautical miles diagonally. Use of PRM may be required to ensure safe separation using this procedure. Further studies must be conducted to determine PRM is needed for this procedure.



Source: 2001 ACE Plan

Preliminary analyses indicated an average of 4 additional arrivals per hour using the reduced 1.5 nm separation standard.

Automated Dependent Surveillance (ADS-B)/Cockpit Display of Traffic Information (CDTI) - Automated Dependent Surveillance (ADS-B) is a system that continuously broadcasts critical aircraft

information to pilots. Broadcast information provided includes Global Positioning System (GPS) position information, aircraft identification, aircraft altitude, and aircraft speed and direction information to all aircraft and air traffic management facilities in a specified area. The Cockpit Display of Traffic Information (CDTI) shows pilots the relative position and movement of nearby ADS-equipped aircraft. ADS-B and CDTI will assist in aircraft taxi operations on the ground. The system provides pilots with greater awareness of traffic, which will allow closer aircraft spacing and mid-flight route changes, for example, where winds or weather are not as originally predicted. The ADS-B system will provide more efficient and safer movement of aircraft on the ground in poor weather and at night.

The Global Positioning System (GPS) provides satellite-based navigation and global coverage. Two GPS signal augmentations will extend GPS navigation and landing capabilities. The Wide Area Augmentation System (WAAS) will provide en route, terminal, non-precision, and some Category I precision approach capability. The Local Area Augmentation System (LAAS) will provide Category II/III precision approach and landing capability, as well as navigation signals for aircraft and ground vehicles, and Category I approach capability at locations where WAAS Category 1 approaches are not available.

Area Navigation (RNAV) Approaches - The FAA is developing RNAV instrument approaches published in new instrument approach charts intended for all aircraft. These approaches do not require use of ground-based navaids to use GPS capabilities. The new approach charts include lateral navigation (LNAV) and lateral navigation/vertical navigation approaches (LNAV/VNAV). An LNAV approach is a non-precision approach (no vertical guidance) with a minimum descent altitude of 250 feet above obstacles on the protected area of the flight path. LNAV approaches can presently be conducted with approach-certified GPS receivers.

An LNAV/VNAV approach is a vertically-guided approach with a decision altitude down to 350 feet or higher above the runway touchdown point. This approach will require a Wide Area Augmentation System (WAAS) certified receiver, which is not currently available, or flight management systems (FMS) with barometric VNAV. The LNAV/VNAV procedure falls between a non-precision approach with no vertical guidance and a true precision approach. The benefit of the LNAV/VNAV approach is a more stable descent path than traditional non-precision instrument approaches. LNAV/VNAV approaches will help reduce the risk of controlled flight-into-terrain at airports with no ILS, or when an ILS is out of service. These approaches also increase access to airports that do not currently have an ILS under low-visibility conditions.

WAAS is expected to deliver LNAV/VNAV approaches at U.S. airports by 2003, thereby greatly increasing safety and access.

Summary of Improved Technology Alternative

The technology initiatives discussed above represent an on-going effort to improve airport and airspace capacity. Benchmark studies have been conducted assessing the benefits of this improved technology at Phoenix-Sky Harbor International Airport. These FAA benchmark studies indicate that the ADS-B/CDTI and FMS/RNAV Routes could improve Sky Harbor airspace capacity by approximately 4 percent.

Specific studies have not been conducted at other system airports; however, it would appear reasonable to assume that somewhat lower capacity improvements (2 – 3 percent) could be expected at Scottsdale and Williams Gateway airports, based on the same FAA analysis contained in benchmark studies. The lower capacity improvements relate to the fact that aircraft operating into these two facilities consist of a much broader mix of general aviation, corporate and some commercial aircraft. The new technology discussed previously requires additional equipment that is currently expensive to purchase and install. Corporate and commercial aircraft operators can much more readily justify the added initial expense of this

equipment. However, general aviation aircraft owners could find the costs associated with the current generation of this equipment prohibitively expensive. All aircraft would need to be similarly equipped for the full benefits of this technology to be available.

Studies have been conducted in the state of Alaska to determine the benefits of the ADS-B/CDTI in general aviation use. These studies indicated the potential for increased capacity and improved aircraft safety. However the full benefit, particularly as it would apply to MAG, is again dependent on the availability of the equipment in all aircraft.

While the benefits and utility of these new technologies may currently be out of reach for the majority of general aviation aircraft owners and operators, it is expected that over the course of the study period, the costs associated with the required equipment will decrease substantially. This has been an on-going phenomenon, not just in aviation but also in other technical fields. Through the course of the study period, it is therefore expected that the general aviation airports will achieve some capacity benefits from these technology initiatives. The degree of capacity improvement would be somewhat less than for the commercial service airports (0.5 - 3.5 percent), but provide some benefit, none-the-less.

In reviewing the impacts of the proposed technology initiatives, a further assumption was formulated that new technology improvements will be on-going. In that regard, it is expected that similar capacity increases can be anticipated at Phoenix-Sky Harbor International, Scottsdale, and Williams Gateway airports throughout the MAG study period. Therefore, the capacity of these facilities would be expected to increase in the range of an additional 4 percent by the end of the study period based on the FAA's benchmark analysis.

Table 4.4 presents the existing and projected capacities of the MAG system airports including the projected capacities with improved technology. Without the improved technology, the MAG system airports are projected to utilize between 84 percent and 87 percent of existing available capacity (see Table 3.7 in previous Working Paper), depending on the 2025 operations scenario for Phoenix-Sky Harbor International. As shown in Table 4.2, under the Improved Technology scenario using the assumptions previously identified, the MAG system airports are projected to utilize approximately 77 percent of existing available capacity (without Phoenix-Sky Harbor International which was examined only on an hourly basis). While improvements in technology are projected to enhance the operational capacity of the MAG airport system, these improvements will still result in an operational capacity deficiency in the Region using general FAA guidelines.

Table 4.4
ASV Impact - Improved Technology

Airport Name	2000 ASV	2025 ASV with Improved Technology	2025 Projected Operations	2025 Ops to ASV Ratio with Improved Technology
Buckeye Municipal	315,560	325,000	215,200	66%
Chandler Municipal	460,000	473,800	514,500	109%
Estrella Sailport	120,000	120,600	16,500	14%
Gila Bend Municipal	212,797	218,100	57,800	27%
Glendale Municipal	257,972	265,700	197,000	74%
Memorial	100,000	100,500	5,500	6%
Mesa Falcon Field	443,000	456,290	472,100	104%
Phoenix-Deer Valley	606,000	621,150	640,600	103%
Phoenix – Goodyear	304,916	311,000	334,200	108%
Phoenix-Sky Harbor International				
Scenario 1	137	148	174	118%
Scenario 2	146	158	214	135%
Pleasant Valley	120,000	120,600	134,300	111%
Scottsdale	200,000	216,000	262,600	122%
Sky Ranch Carefree	174,000	176,610	13,000	7%
Stellar Airpark	286,700	291,000	78,400	27%
Wickenburg Municipal	245,000	251,100	38,100	15%
Williams Gateway	410,000	442,800	420,300	95%
MAG (minus Sky Harbor)	**4,255,945**	**4,390,250**	**3,400,100**	**77%**

Source: Wilbur Smith Associates

Maximized Airport Development

MAG system airports will be evaluated to determine which airports can accommodate additional runways to improve the Region's operational capacity, a key deficiency of the existing system in the latter stages of the study period. The criteria used to determine the need for additional capacity improvements was based on the FAA's planning benchmarks of 60 and 80 percent of operations to ASV ratios. In this alternative, if an airport is projected to surpass 80 percent of its ASV using the RASP's 2025 operations projections, the ability of the airport to accommodate a parallel runway was considered. If an airport is projected to surpass only 60 percent, but less than 80 percent, the ability of the airport to carry a parallel runway in its future planning documents was considered. A number of airports have existing constraints that must be recognized. At three airports in the Region's system (Glendale, Mesa Falcon Field, and Scottsdale), parallel runways are not supported by the sponsor. For purposes of the RASP, parallel runways will not be evaluated at these airports. For other airports where operational capacity is an issue, parallel runways will be addressed in terms of need in this Working Paper and evaluated for feasibility in a subsequent Working Paper. As with the Status Quo and Improved Technology alternatives, projects

identified in ADOT's most recent CIP are assumed to be implemented in the Maximized Airport Development alternative.

This alternative scenario also assumes all airports will meet applicable design standards and needed facilities will be developed to accommodate projected demand through 2025. This alternative further incorporates facility improvements identified in the respective airport master plans, where such plans have been prepared and adopted by the respective airport sponsors. A number of the system airports' existing planning documents and approved Airport Layout Plans identified development to accommodate projected growth during the time-frame for which these documents were developed. As appropriate, those facility improvements will be incorporated in this alternative scenario. Furthermore, those policies currently in place that restrict airport development in the Region will be incorporated into the maximized development of the existing airport system scenario.

This alternative scenario identifies development of those facilities required to reasonably accommodate the projected activity for the respective MAG system airports, as presented in Working Paper Number 3. The intent of this scenario is to maximize specific airport facility development to accommodate the aviation activity projected for each airport within the capabilities of the sites and their surrounding communities to accommodate the projected development. The specific use of each airport is not expected to change dramatically from its current status. For example, those facilities currently accommodating an overwhelming preponderance of sailplane and ultralight activity are expected to continue serving those activities throughout the course of the study period.

Table 4.5 summarizes the major development items for each airport associated with the Maximized Airport Development alternative.

Table 4.5
Maximized Airport Development Summary

Airport Name	Recommended Development
Buckeye Municipal	ARC upgrade to C-II, Runway extended to 7,300' widened to 100' and strengthened, Precision approach with MALS & HIRL, 7.7 acres aircraft storage
Chandler Municipal	Taxiway extension to full length, ARC upgrade to C-II, Runway extended to 6,800' widened to 100', New Taxiway, Precision approach with MALS & HIRL, 41.5 acres aircraft storage
Estrella Sailport	Installation of NAVAIDs
Gila Bend Municipal	Pavement strength upgrade, Full parallel taxiway, Non-precision approach, Visual approach guidance installation
Glendale Municipal	ARC upgrade to C-II, Runway and taxiway extension to 6,100' widened to 100' and strengthened, New east parallel taxiway at C-II separation, Precision approach with MALS & HIRL, 15.6 acres aircraft storage expansion
Memorial	Runway reconstruction and pavement strength upgrade, Closure of crosswind runway, New parallel taxiway, Non-precision instrument approach, Visual approach guidance installation, 1.1 acres aircraft storage expansion
Mesa Falcon Field	Additional runway exits, Precision approach with MALS & HIRL, 66.3 acres aircraft storage expansion
Phoenix - Deer Valley	Parallel runway, Runway to taxiway separation for parallel runway at precision standards, Precision approach with MALS & HIRL, 87.8 acres aircraft storage expansion
Phoenix – Goodyear	Parallel runway, Precision approach with MALS & HIRL, 37.7 acres aircraft storage expansion
Phoenix - Sky Harbor International	
Scenario 1	Parallel runway, Full parallel taxiway, Precision approach with MALS & HIRL, Passenger terminal building expansion – 2.5 million S.F. and 43 gates, 5,600 parking spaces
Scenario 2	Parallel runway, Full parallel taxiway, Precision approach with MALS & HIRL, Passenger terminal building expansion – 3.9 million S.F. and 73 gates, 12,100 parking spaces
Pleasant Valley	Pave runway and full-length parallel taxiway, Install MIRL & MITL, Non-precision, Visual approach guidance installation, Install REILs and airport beacon, 7.1 acres aircraft storage expansion
Scottsdale	Construct full-length east side parallel taxiway, Construct additional runway exits, Precision approach with MALS & HIRL, Passenger terminal building expansion, 4.8 acres aircraft storage expansion
Sky Ranch Carefree	Widen runway to 60 feet, Install visual approach guidance system, 14.6 acres aircraft storage expansion
Stellar Airpark	Aircraft storage expansion
Wickenburg Municipal	ARC upgrade to C-II, Runway extended to 7,500' widened to 100' and pavement strength upgrade, Relocate taxiway to meet C-II standards, Non-precision approach, Install REILs, 5.8 acres aircraft storage including replacement storage
Williams Gateway	Extend runway 12L-30R to 12,500 feet, Construct full-length parallel taxiway to Runway 12L-30R, Construct angled runway exits, Precision approach with MALS & HIRL, Passenger terminal building expansion – 300,000 S.F., 23.8 acres aircraft storage

Source: Wilbur Smith Associates

Each of the MAG System airports is discussed in the following narrative, identifying those projects that can reasonably be implemented within the existing airport sites and those projects necessary to accommodate projected aviation activity through the year 2025. Facilities at those system airports included in the National Plan of Integrated Airport Systems (NPIAS) should be developed to meet FAA recommended design criteria for their respective airport reference code. Those system airports not designated in the NPIAS are not expected to be developed to meet FAA recommended criteria.

Buckeye Municipal Airport
Airside
Airfield Capacity - Buckeye Municipal Airport has an existing ASV of approximately 315,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 215,200 operations, or roughly 68 percent of the existing ASV. FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV. Therefore, for the RASP, a new runway is not included as a need during the planning period, but should be considered a potential long-term need and, as identified in the airport's current airport layout plan, development of a second parallel runway could be included as post-planning period.

Runway Length/Width/Strength – The current Airport Reference Code for Buckeye Municipal Airport is B-II, which results in an FAA recommended runway length of 4,300 feet and a runway width of 75 feet. The pavement strength recommended to accommodate a B-II ARC is 30,000 pounds, single wheel loading. The airport Master Plan recommends an upgrade of the ARC to C-II, which would result in an ultimate runway length of 7,300 feet and recommended runway width of 100 feet. The pavement strength associated with the upgraded ARC would be 60,000 pounds dual wheel loading. The current ADOT CIP includes projects to extend the runway to 5,500 feet in length, widen the pavement to 100 feet in width, and strengthen the extended runway pavements, as discussed previously. These projects will result in an upgrade in the ARC to the C-II classification. The maximized development alternative includes extending the runway to an overall length of 7,300 feet.

Parallel Taxiway - Separation/Length/Width - The present runway - taxiway separation at Buckeye Municipal Airport is 400 feet, which exceeds the FAA recommended minimum for a B-II ARC. However, upgrading the ARC to a C-II classification (with not lower than ¾ statute mile approach visibility minimums – non-precision approach) would result in a recommended runway - taxiway separation of 300 feet. Therefore development of the existing runway to C-II criteria could be accomplished using the existing runway – taxiway separation. An extension of the parallel taxiway to serve the extended (7,300') runway is included in this alternative.

Navigational Aids – Buckeye Municipal Airport currently has no precision instrument approach capability. The airport Master Plan includes development of precision instrument GPS approach capability with medium intensity approach lights (MALS) and has been included in the Maximized Airport Development alternative. Installation of the MALS would also include an upgrade to the existing medium intensity runway lights (MIRL) to high intensity runway lights (HIRL). The Maximized Airport Development alternative includes development of a precision approach at Buckeye based on the Master Plan's recommendation.

Landside
Aircraft Storage - The Inventory element of the RASP identified 55 based aircraft at Buckeye Municipal Airport in the base year 2000. By the year 2025, the airport is projected to accommodate 77 additional based aircraft. Additional apron tiedown space and hangar facilities will be required to accommodate the projected increase in based aircraft during the study period. The facility requirements previously identified the need for development of an additional 7.7 acres of based aircraft space during the 2000-2025 period. Adequate land is available to accommodate the aircraft storage hangar facilities required to

meet the projected demand throughout the study period. The Maximized Airport Development alternative therefore includes development of a total of 7.7 additional acres of aircraft storage facilities at Buckeye Municipal Airport.

Chandler Municipal Airport
Airside
Airfield Capacity - Chandler Municipal Airport has an existing ASV of approximately 460,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 514,500 operations, or almost 112 percent of the existing ASV. FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and construction when activity reaches 80 percent of ASV. Airfield capacity is currently limited due to the lack of a full-length parallel taxiway serving Runway 4L-22R. The existing airport layout plan identifies development of a future full-length parallel taxiway to serve Runway 4L-22R, which will improve overall airport capacity. Development of this parallel taxiway should increase the airport's ASV by approximately 10 - 15 percent, from 460,000 operations currently to approximately 506,000 – 529,000 operations. Given surrounding land constraints, it is not likely that additional airfield capacity can be provided, beyond the added operations level provided by construction of the proposed full-length parallel taxiway.

Runway Length/Width/Strength - The current Airport Reference Code for Chandler Municipal Airport is B-II, with an FAA recommended runway length of 4,400 feet and runway width of 75 feet. The pavement strength recommended to accommodate a B-II ARC is 12,500 pounds, single wheel loading. The airport Master Plan recommends an upgrade of the ARC to C-II, with a recommended Runway 4R-22L length of 6,800 feet and ultimate runway width of 100 feet. The existing pavement strength of 30,000 pounds single wheel loading would be compatible with the upgraded ARC as presented in the Master Plan. The combined runways would provide adequate runway length to accommodate the aircraft activity projected for the airport and meet the FAA recommended design standards for the C-II ARC (with Runway 4L-22R maintained at B-II standards). The recommended improvements to Runway 4R-22L (extension and widening) are included in the Maximized Airport Development alternative.

Parallel Taxiway - Separation/Length/Width - The present Runway 4R-22L - taxiway separation at Chandler Municipal Airport is 400 feet, which exceeds the FAA recommended minimum for a B-II ARC. However, the recommended upgrade of the ARC to a C-II classification would result in a recommended Runway 4R-22L - taxiway separation of 300 feet for a non-precision approach (not lower than ¾ statute mile approach visibility minimums) and 400 feet for a precision approach (lower than ¾ statute mile approach visibility minimums). Development of the existing Runway 4R-22L to C-II criteria can be accomplished incorporating the existing runway – taxiway separation. An extended, full-length parallel taxiway is also recommended to serve the extended (6,800') runway. As discussed previously, a full-length parallel taxiway is also proposed for construction to serve Runway 4L-22R with a runway – taxiway separation distance of 240 feet, meeting the existing B-II separation criteria. The extension of the existing Runway 4R-22L parallel taxiway and construction of a new Runway 4L-22R parallel taxiway are recommended in the Maximized Airport Development alternative for the Chandler Municipal Airport.

Navigational Aids/Lighting - Chandler Municipal Airport currently has a non-precision instrument approach. The "Navigational Aids and Aviation Services Special Study" indicated that installation of an approach light system (ALS) would be economically justified at the airport. Therefore, a MALS is included in the Maximized Airport Development alternative for Chandler Municipal Airport. It is recommended that the existing MIRL will also be upgraded to HIRL, with installation of the MALS, as recommended in the "Navigational Aids and Aviation Services Special Study". Development of a precision instrument RNAV/GPS approach was also recommended in the study and is included in this alternative for Chandler Municipal.

Landside

Aircraft Storage - Chandler Municipal Airport had a total of 392 based aircraft in the base year 2000, as tabulated in the Inventory element of the RASP. By the year 2025, the airport is projected to accommodate 415 additional based aircraft. To accommodate the projected increase in based aircraft during the study period, additional apron tiedown space and hangar facilities will be required. The Facility Requirements Working Paper identified the need to develop an additional 41.5 acres of based aircraft storage space during the 2000-2025 time frame. A review of the existing airfield layout indicates that adequate land is available to accommodate all of the aircraft storage hangar facilities required to meet the projected demand throughout the study period. A total of 41.5 additional acres of aircraft storage facilities are identified for development at Chandler Municipal Airport in the Maximized Airport Development alternative.

Estrella Sailport

Airside

Airfield Capacity - Estrella Sailport is a non-NPIAS facility with four dirt runways and an existing ASV of approximately 120,000 annual operations. None of the runways have parallel taxiways. The projected activity levels at the airport by the year 2025 will total approximately 16,500 operations, or less than 14 percent of the existing ASV. The airport has a substantial amount of glider activity, which can be readily accommodated with the existing airfield facilities throughout the study period.

Runway Length/Width/Strength – Estrella Sailport's existing 3,740-foot runway length exceeds the FAA recommended minimum runway length of 3,700 feet. The existing 50-foot runway width does not meet the FAA recommended 60-foot minimum for an A-I ARC. However, the airport is not included in the NPIAS, and is not expected to be upgraded to meet these criteria. The existing dirt runways accommodate the current and projected activity at the facility.

Parallel Taxiway - Separation/Length/Width – Estrella Sailport does not currently have full-length parallel taxiways serving any of the three existing runways. It is not anticipated that parallel taxiways would be constructed at Estrella Sailport.

Navigational Aids/Lighting - Estrella Sailport does not currently have VASI/PAPI or REILs. As recommended in the "Navigational Aids and Aviation Services Special Study", installation of a VASI/PAPI system and REILs have been identified for Estrella Sailport.

Landside

Aircraft Storage - Estrella Sailport had a total of 23 based aircraft in the base year 2000, as tabulated in the Inventory element of the RASP. The airport is not projected to accommodate any additional based aircraft during the course of the study period. Therefore, no additional aircraft storage facilities are identified for development at Estrella Sailport.

Gila Bend Municipal Airport

Airside

Airfield Capacity - Gila Bend Municipal Airport has an existing ASV of approximately 213,000 operations. The projected activity levels at the airport by the year 2025 will total approximately 57,800 operations, or just over 27 percent of the existing ASV. FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV.

Runway Length/Width/Strength - The current Airport Reference Code for Gila Bend Municipal Airport is B-II, with an FAA recommended runway length of 4,200 feet and recommended runway width of 75 feet. The pavement strength recommended to accommodate a B-II ARC is 30,000 pounds, single wheel loading. The existing Runway 4-22 is 5,200 feet long and 75 feet wide, which exceeds the recommended

runway length and meets the recommended runway width. However, existing pavement strength at 12,500 pounds single wheel loading, does not meet the recommended 30,000-pound single wheel loading pavement strength for a B-II ARC. The existing pavement strength should therefore be upgraded to 30,000 pounds single wheel loading to be compatible with the existing ARC.

Parallel Taxiway - Separation/Length/Width - The present Runway 4-22 - taxiway separation at Gila Bend Municipal Airport is 250 feet, which exceeds the FAA recommended minimum for a B-II ARC of 240 feet. Existing parallel taxiway width is 40 feet, which meets the FAA recommended minimum of 35 feet. However, Runway 4-22 does not presently have a full-length parallel taxiway. A partial parallel taxiway serves the middle portion of the runway. Therefore, an extension of the parallel taxiway for Runway 4-22 to both runway ends is included in the Maximized Airport Development alternative for Gila Bend Municipal Airport.

Navigational Aids/Lighting - Installation of medium intensity taxiway lights to serve the extended parallel taxiway have been identified in the Maximized Airport Development alternative for Gila Bend Municipal Airport. As recommended in the "Navigational Aids and Aviation Services Special Study", a non-precision RNAV/GPS approach to Gila Bend Municipal Airport is recommended in addition to installation of a visual approach guidance system (VASI/PAPI) and REILs.

Landside

Aircraft Storage - Gila Bend Municipal Airport had 1 based aircraft in the base year 2000, as tabulated in the Inventory element of the RASP. The airport is projected to have a total of 10 based aircraft by the year 2025. Existing apron tiedown space and hangar facilities are adequate to accommodate the projected demand throughout the study period. Therefore, no additional aircraft storage facilities are identified for development at the Gila Bend Municipal Airport in the Maximized Airport Development alternative.

Glendale Municipal Airport

Airside

Airfield Capacity - Glendale Municipal Airport's Runway 1-19 has an existing ASV of approximately 258,000 annual operations. Projected activity levels at the airport by the year 2025 will total approximately 197,000 operations, or a little more than 76 percent of the existing ASV. FAA criteria, as discussed previously, recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV. However, the sponsor has determined that a second runway will not be pursued at Glendale Municipal Airport.

Runway Length/Width/Strength – Glendale Municipal Airport's ARC is currently B-II, with an FAA recommended runway length of 4,300 feet and recommended runway width of 75 feet. The airport Master Plan recommends an upgrade of the ARC to C-II, with a recommended Runway 1-19 length of 6,100 feet and ultimate runway width of 100 feet. The existing pavement strength of 30,000 pounds single wheel loading would be upgraded to 60,000 pounds dual wheel gear, as presented in the Master Plan. The current ADOT CIP includes airport development projects providing the runway length, width and strength associated with the C-II ARC recommendations.

Parallel Taxiway – Separation/Length/Width – The present Runway 1-19 - taxiway separation at Glendale Municipal Airport is 240 feet, which meets the FAA recommended minimum for a B-II ARC. However, the upgrade of the ARC to a C-II classification would result in a recommended Runway 1-19 - taxiway separation of 300 feet for a non-precision approach and 400 feet for a precision approach. Current plans do not call for a re-alignment of the existing parallel taxiway to provide for the 300/400-foot C-II runway – taxiway separation. The current ADOT CIP includes the extension of the parallel taxiway to the extended Runway 1-19 end. The existing 35-foot parallel taxiway width meets recommended FAA design criteria for a C-II ARC. In addition to the existing parallel taxiway, the

ADOT CIP includes development of a second parallel taxiway on the east side of the airfield. For the Maximized Airport Development alternative, this second parallel taxiway is assumed to be developed at a separation of 400 feet to meet FAA standards for a C-II precision approach runway.

Navigational Aids/Lighting - The "Navigational Aids and Aviation Services Special Study" indicated that installation of an ALS would be economically justified at Glendale Municipal Airport. Therefore, a MALS is included in the Maximized Airport Development alternative for Glendale Municipal Airport. As recommended in the "Navigational Aids and Aviation Services Special Study", the existing MIRL will also be upgraded to HIRL, with installation of the MALS. These aids are needed to serve the recommended precision RNAV/GPS approach that was also identified for Glendale Municipal Airport.

Landside

Aircraft Storage – Glendale Municipal Airport had a total of 208 based aircraft in the base year 2000. By the year 2025, the airport is projected to accommodate 156 additional based aircraft. To accommodate the projected increase in based aircraft during the study period, additional apron tiedown space and hangar facilities will be required. A review of the existing airfield layout indicates that adequate land is available to accommodate all of the aircraft hangar storage facilities required to meet the projected demand throughout the study period. A total of 15.6 additional acres of aircraft storage facilities are included for development at the Glendale Municipal Airport in this alternative development scenario.

Memorial Airport

Airside

Airfield Capacity - Memorial Airport is not currently a NPIAS airport. Memorial Airport has an existing ASV of approximately 100,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 5,500 operations, or approximately 5.5 percent of the existing ASV. With this limited ratio of operations to ASV, a parallel runway was not considered in the Maximized Airport Development alternative for Memorial. However, bringing the existing airport out of disrepair and providing an instrument approach would increase the ASV to approximately 240,000.

Runway Length/Width/Strength - The current Airport Reference Code for Memorial Airport is C-III. The FAA recommended runway length is 6,700 feet and runway width is 100 feet. The pavement strength recommended to accommodate a C-III ARC is 60,000 pounds, dual wheel loading. The existing Runway 12-30 length is 8,577 feet with a runway width of 150 feet. The existing pavement strength is not known, as the runway is in disrepair. However, it is assumed that it would not be compatible with the C-III ARC. Current plans indicate that Runway 12-30 would be paved to a strength of 150,000 pounds single wheel loading and reduced to 100 feet in width. The existing crosswind Runway 3-21 would ultimately be abandoned. The recommended improvements to Runway 12-30 in the Maximized Airport Development alternative include reconstruction/paving the runway 100 feet in width with a pavement strength of 150,000 pounds dual wheel loading and closure of Runway 3-21.

Parallel Taxiway - Separation/Length/Width - The present Runway 12-30 - taxiway separation at Memorial Airport is 1,000 feet, which significantly exceeds the FAA recommended minimum for a C-III ARC of 400 feet. This full-length taxiway is 75 feet wide. The FAA recommended taxiway width is 50 feet. The parallel taxiway should be reconfigured and paved at a distance of 400 feet from the runway centerline, with a taxiway width of 50 feet to maximize airfield development for Memorial Airport.

Navigational Aids/Lighting - Memorial Airport currently does not have an instrument approach. A nonprecision RNAV/GPS approach is recommended and has been included in the Maximized Airport Development alternative for Memorial Airport, as recommended in the "Navigational Aids and Aviation Services Special Study". The study also recommended that a visual guidance facility such as a VASI or PAPI be installed at the airport.

Landside

Aircraft Storage - Memorial Airport had a total of 8 based aircraft in the year 2000, with a projected total of 19 by the year 2025. To accommodate the projected increase in based aircraft during the study period, an additional 1.1 acres of based aircraft storage space would be needed during the planning period. The existing airfield layout indicates that adequate land is available to accommodate all aircraft storage hangar facilities required to meet the projected demand throughout the study period. A total of 1.1 additional acres of aircraft storage facilities are recommended for development at the Memorial Airport in the Maximized Airport Development alternative.

Mesa Falcon Field

Airside

Airfield Capacity - Mesa Falcon Field has an existing ASV of approximately 443,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 472,100 operations, or almost 107 percent of the existing ASV. As previously discussed, FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and providing that additional capacity when the ratio reaches 80 percent of ASV. While a significant increase in airfield capacity is not likely, it is believed that additional capacity can be derived from the existing airfield with the construction of additional exit taxiways to serve Runway 4L-22R, thus increasing the runway exit rating. With development of additional exit taxiways, the ASV for Mesa Falcon Field has been estimated at 510,000 operations. This would still indicate a demand to capacity ratio of 89 percent in 2025 based on the projected number of operations, resulting in a continued need for additional improvements to enhance the operating capacity of the airport.

Runway Length/Width/Strength - The current Airport Reference Code for Mesa Falcon Field is B-II, with an FAA recommended runway length of 4,400 feet and runway width of 75 feet. The pavement strength recommended to accommodate a B-II ARC is 12,500 pounds, single wheel loading. The existing primary runway length is 5,100 feet with a runway width of 100 feet and pavement strength of 38,000 pounds single wheel loading, all of which exceed FAA recommended minimums. No additional runway development is therefore identified at Mesa Falcon Field during the study period.

Parallel Taxiway - Separation/Length/Width – The present Runway 4R-22L - taxiway separation at Mesa Falcon Field is 250 feet, which exceeds the FAA recommended minimum for a B-II ARC of 240 feet. The Runway 4L-22R - taxiway separation is 200 feet. Full-length parallel taxiways are provided to serve both Runways 4R-22L and 4L-22R. It is recommended that additional taxiway exits be constructed to serve Runway 4L-22R, as discussed in the airfield capacity assessment, in order to increase the taxiway exit rating to a level of 1.0 in the Maximized Airport Development alternative.

Navigational Aids/Lighting – Mesa Falcon Field currently has a non-precision instrument approach. The "Navigational Aids and Aviation Services Special Study" previously referenced indicated that installation of an ALS would be economically justified at the Falcon Field. Therefore, it is recommended that a MALS be installed at Falcon Field, with the existing MIRL upgraded to HIRL, upon installation of the MALS as recommended in the "Navigational Aids and Aviation Services Special Study". The study also recommended development of a precision RNAV/GPS approach at Mesa Falcon Field.

Landside

Aircraft Storage – Mesa Falcon Field had a total of 923 based aircraft in the RASP base year 2000. By the year 2025, the airport is projected to accommodate 663 additional based aircraft. Additional apron tiedown space and hangar facilities will be required to accommodate the projected increase in based

aircraft during the study period. An additional 66.3 acres of based aircraft storage space will be needed during the 2000-2025 time frame. Evaluation of the existing airfield layout indicates that land is available to accommodate the majority if not all of the aircraft storage hangar facilities required to meet the projected demand. A total of 66.3 additional acres of aircraft storage facilities are therefore included in the Maximized Airport Development alternative for Mesa Falcon Field.

Phoenix-Deer Valley Airport
Airside
Airfield Capacity - Phoenix-Deer Valley Airport has an existing ASV of approximately 606,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 640,600 operations, or almost 106 percent of the existing ASV. FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and constructing those facilities at 80 percent of ASV. A third parallel runway is included in the Maximized Airport Development alternative for Phoenix-Deer Valley Airport based on this operations-to-ASV ratio projected for 2025. Development of a third parallel runway at Phoenix-Deer Valley Airport could generate an additional 30,000 operations for the airport's ASV. With an ASV of 650,000 with a third parallel runway, the airport's operations to ASV ratio would be reduced to 99 percent in 2025.

Runway Length/Width/Strength – The current Airport Reference Code for Phoenix-Deer Valley Airport is D-II, with an FAA recommended runway length of 7,100 feet and a runway width of 100 feet. Runway 7R-25L at 8,200 feet long by 100 feet wide provides the FAA recommended minimum runway takeoff length and width. The current pavement strength of 40,000 pounds single wheel configuration can accommodate aircraft in the D-II ARC, which consist primarily of large corporate aircraft such as the Gulfstream IV. In order to obtain to the highest increase in operational capacity, the third parallel runway would need to be an appropriate length, width, and strength. For purposes of the RASP, a runway length of at least 5,000 feet would appear appropriate for a third runway at Phoenix-Deer Valley Airport.

Parallel Taxiway - Separation/Length/Width – The present Runway 7R-25L - taxiway separation at Phoenix-Deer Valley Airport is 300 feet, which meets the FAA recommended minimum for a D-II ARC. Full-length parallel taxiways are provided to both Runways 7R-25L and 7L-25R. The construction of angled exit taxiways is recommended to serve Runway 7L-25R, which would provide some additional airfield capacity. If a precision approach were developed at the airport, the runway – taxiway separation would need to be increased to 400 feet. This could be accomplished with the proposed additional parallel runway.

Navigational Aids/Lighting – Phoenix-Deer Valley Airport currently has a non-precision instrument approach. As with a number of other system airports, the "Navigational Aids and Aviation Services Special Study" indicated that installation of an ALS would be economically justified at the Phoenix-Deer Valley Airport. Therefore, a MALS is recommended and has been included in the Maximized Airport Development alternative for Phoenix-Deer Valley Airport. Also as recommended in the study, the existing MIRL are identified to be upgraded to HIRL, with installation of the MALS at the time a precision RNAV/GPS approach is installed.

Landside
Aircraft Storage – Phoenix-Deer Valley Airport had a total of 1,206 based aircraft in the RASP base year 2000. By the year 2025, the airport is projected to accommodate 878 additional aircraft. An additional 87.8 acres of based aircraft apron tiedown space and hangar facilities will be required during the 2000-2025 time frame and are identified for development at the Phoenix-Deer Valley Airport in the Maximized Airport Development alternative. Development of these aircraft basing facilities is recommended for the area west of Runway 7L-25R and north of the west side hangar area.

Phoenix-Goodyear Airport
Airside

Airfield Capacity - Phoenix-Goodyear Airport has an existing ASV of approximately 305,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 334,200 operations, or almost 110 percent of the existing ASV. Based on the previously discussed FAA criteria that recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and construction when activity reaches 80 percent of ASV, additional airfield capacity should be provided at the Phoenix-Goodyear Airport. The existing airport layout plan identifies development of a future parallel Runway 3L-21R, which will significantly increase overall airfield capacity. Development of this parallel runway should increase the airport's ASV by in excess of 50 percent, from approximately 305,000 operations currently to approximately 470,000 operations. This parallel runway is included as part of the Maximized Airport Development alternative.

Runway Length/Width/Strength – The current Airport Reference Code for Phoenix-Goodyear Airport is D-IV, with an FAA recommended runway length of 8,200 feet and runway width of 150 feet. Existing Runway 3-21 at 8,500 feet in length by 150 feet in width meets the FAA recommended minimums for the airport's D-IV ARC. The current pavement strength of 200,000 pounds dual wheel loading can readily accommodate aircraft typical of a D-IV ARC, which include a number of commercial type aircraft such as the DC-10 and MD-11. Development of a new parallel Runway 3L-21R at 4,200 feet long by 75 feet wide has been included in the Maximized Airport Development alternative for Phoenix-Goodyear Airport.

Parallel Taxiway - Separation/Length/Width – The present Runway 3-21 - taxiway separation at Phoenix-Goodyear Airport is 400 feet, which meets the FAA recommended minimum for a D-IV ARC. This taxiway, at 75 feet in width, also meets FAA recommended design criteria for a D-IV ARC. Construction of a parallel runway, to be designated 3L-21R is included in the runway facilities previously discussed. A full-length parallel taxiway is also included for construction to serve the new Runway 3L-21R with a runway – taxiway separation distance of 400 feet, meeting the existing D-IV separation criteria.

Navigational Aids/Lighting – Phoenix-Goodyear Airport currently has a non-precision instrument approach. Implementation of a precision RNAV/GPS approach has been included in the navigational facilities for the airport, as recommended in the "Navigational Aids and Aviation Services Special Study". This study also indicated that installation of an ALS would be economically justified at the airport. Therefore, a MALS is recommended and has been included in the Maximized Airport Development alternative for Phoenix–Goodyear Airport with the existing MIRL upgraded to HIRL, upon installation of the MALS.

Landside

Aircraft Storage – Phoenix-Goodyear Airport had a total of 280 based aircraft in the RASP base year 2000. An additional 377 based aircraft are projected at the airport between 2000 and 2025. Additional apron tiedown space and hangar facilities will be required to accommodate these additional based aircraft during the study period. The Facility Requirements Working Paper identified a need for an additional 37.7 acres of based aircraft storage space during the study period. The existing airfield layout indicates that these additional based aircraft storage facilities can be accommodated in the area south of the existing aircraft storage hangar facilities. A total of 37.7 additional acres of aircraft storage facilities are therefore included in the Maximized Airport Development alternative at the Phoenix–Goodyear Airport.

Phoenix-Sky Harbor International Airport
Airside

Airfield Capacity - In evaluating airfield capacity at Phoenix-Sky Harbor International, a review of the hourly airfield capacity was performed. This review determined that the existing runway configuration could accommodate approximately 137-146 peak hour arrivals and departures, in good weather conditions, according to FAA documents. The activity projections for Phoenix-Sky Harbor International indicate peak hour arrivals and departures will range between 174 and 214 by the year 2025. Given these projections, additional airfield capacity will be required to accommodate future activity levels. In that regard, development of a fourth parallel runway will be considered in the Maximized Airport Development alternative. It is estimated that a fourth runway at Phoenix-Sky Harbor International Airport could raise the operational capacity an additional 5 to 12 percent. Applying these to the FAA's estimates of peak hour capacities yields a range of 144 to 164 peak hour arrivals and departures that could be accommodated with a fourth runway.

Runway Length/Width/Strength – The current Airport Reference Code for Phoenix-Sky Harbor International Airport is D-V, with an FAA recommended runway length of 11,000 feet and runway width of 150 feet. The existing airfield pavement strengths can accommodate all aircraft in the D-V ARC. Runway 8L-26R at 11,001 feet in length by 150 feet in width is currently being extended to an overall length of 12,000 feet. The approved airport layout plan depicts an ultimate length for Runway 7R-25L of approximately 9,500 feet. The extension to Runway 7R-25L and construction of the fourth parallel runway are included in the Maximized Airport Development alternative.

Parallel Taxiway - Separation/Length/Width – The present runway – parallel taxiway separations at Phoenix-Sky Harbor International Airport are 400 feet, which meet the FAA recommended minimum for a D-V ARC. A full-length parallel taxiway would be developed to serve the proposed fourth parallel runway.

Navigational Aids/Lighting – Phoenix-Sky Harbor International Airport currently has precision instrument approach capabilities to all three runways, with high intensity lighting on each of these runways. A precision instrument approach would be needed for the fourth parallel runway as well as lighting.

Landside

Commercial Terminal Facilities - Phoenix-Sky Harbor International Airport passenger enplanements in the year 2000 totaled approximately 17.5 million passengers. The three airport terminals (Terminals 2, 3, and 4) provide approximately 2.4 million square feet of passenger terminal space with 99 aircraft boarding gates, 94 of which are active. By the year 2025, the airport is projected to enplane between 28.2 million passengers in Scenario One and 36.3 million passengers in Scenario Two. In terms of building space, Scenario One will require the construction of an additional 2.5 million square feet of passenger terminal space while Scenario Two will result in the need for an additional 3.9 million square feet of passenger terminal space. In terms of aircraft boarding gates, Scenario One will require construction of 43 additional aircraft gates and Scenario Two will require the construction of 73 additional aircraft loading gates. Under Scenario One, an additional 5,600 parking spaces would be needed to serve projected and demand; 12,100 additional parking spaces were identified to meet the demand identified in Scenario Two.

Aircraft Storage – Phoenix-Sky Harbor International Airport had a total of 237 based aircraft in the year 2000. By the year 2025, the airport is projected to have a total of 135 based aircraft, a reduction of 102 based aircraft. The reduction in based aircraft at Phoenix-Sky Harbor International is expected to result in the availability of an additional 10.2 acres of land for other uses during the 2000-2025 period. Based on the projections of based aircraft at the airport, no additional aircraft storage facilities are identified.

Pleasant Valley

Airside

Airfield Capacity - Pleasant Valley Airport is a non-NPIAS airport with an existing ASV of approximately 120,000 annual operations. Projected activity levels at the airport by the year 2025 will total approximately 134,300 operations, or almost 112 percent of the existing ASV. Applying FAA criteria that recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and constructing those facilities when activity reaches 80 percent of ASV, facilities to provide additional capacity should be developed at Pleasant Valley Airport. In order to improve the operational capacity of Pleasant Valley, runway and taxiway paving would be needed. With an instrumented runway with a full parallel taxiway, operational capacity can be increased to 230,000, providing sufficient capacity to accommodate projected demand at the airport, and is included in this alternative.

Runway Length/Width/Strength – The current Airport Reference Code for Pleasant Valley Airport is B-I, with an FAA recommended runway length of 3,800 feet and runway width of 60 feet. The pavement strength recommended to accommodate a B-I ARC is 12,500 pounds, single wheel loading. The existing facilities at Pleasant Valley Airport consist of three parallel dirt runways, one of which is partially paved (approximately 1,780 feet) and a dirt crosswind runway. The existing pavement strength is not known. The Maximized Airport Development alternative for Pleasant Valley Airport includes paving 3,800 feet of the existing partially paved runway, at a width of 60 feet. Runway pavement strength should be designed to 12,500 pounds single wheel loading.

Parallel Taxiway - Separation/Length/Width – Pleasant Valley Airport currently has no taxiways. However, the Maximized Airport Development alternative for the airport includes converting the present dirt runway, which is adjacent to the partially paved runway, into a paved, full-length 25-foot wide parallel taxiway. The runway – taxiway separation should be established at a minimum of 225 feet, which meets the existing B-I separation criteria.

Navigational Aids/Lighting – Development of a non-precision RNAV/GPS approach has been included in the Maximized Airport Development alternative for the Pleasant Valley Airport based on recommendations from the "Navigational Aids and Aviation Services Special Study". Installation of a visual approach guidance system (VASI/PAPI) and REILs are also included for Pleasant Valley Airport, as recommended in the study. Airfield lighting is included consisting of MIRL and medium intensity taxiway lights with an airport beacon and lighted wind cone and segmented circle.

Landside

Aircraft Storage – Pleasant Valley Airport had a total of 45 based aircraft in the year 2000. By the year 2025, the airport is projected to accommodate 71 additional based aircraft. To accommodate these additional aircraft, additional apron tiedown space and hangar facilities will be required with the need to develop an additional 7.1 acres of based aircraft storage space during the study period. Adequate land is available to accommodate all aircraft storage hangar facilities required to meet the projected demand through the study period. A total of 7.1 additional acres of aircraft storage facilities are included for development at the Pleasant Valley Airport.

Scottsdale Airport
Airside
Airfield Capacity - Scottsdale Airport has an existing ASV of approximately 200,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 262,600 operations, or more than 131 percent of the existing ASV. FAA criteria recommend planning for additional airfield capacity when an airport reaches 60 percent of its ASV and construction when activity reaches 80 percent of ASV. Some improvement in overall airfield capacity should be achieved with the construction of new angled exit taxiways and completion of the second full-length parallel taxiway to the Runway 21 end, which serves the developing east side general aviation area. These improvements are estimated to increase capacity by 10 to 15 percent. Given surrounding land constraints and the opposition of the airport sponsor to the construction of a second runway, airfield capacity cannot be provided, beyond the added operations level provided through construction of the previously discussed angled exit taxiways and completion of the full-length parallel taxiway serving the east side of the airfield. Development of these improvements at Scottsdale would increase the ASV to approximately 225,000.

Runway Length/Width/Strength – The current Airport Reference Code for Scottsdale Airport is D-II, with an FAA recommended runway length of 7,000 feet and a runway width of 100 feet. The existing airfield pavement with a rated strength of 45,000 pounds single wheel loading will accommodate aircraft in the D-II ARC. Aircraft in this Airport Reference Code primarily consist of corporate business aircraft. Runway 3-21, with an existing length of 8,251 feet and width of 100 feet, meets the FAA recommended design criteria minimums for the airport. No additional runway development is identified for Scottsdale Airport in this alternative.

Parallel Taxiway - Separation/Length/Width – The present Runway 3-21 - taxiway separation at Scottsdale Airport is 250 feet, which is less than the FAA recommended minimum of 300 feet. However, the airport has a modification to standards for the existing runway - taxiway separation of 250 feet. The approved airport layout plan includes completion of the full-length parallel taxiway to serve the east side general aviation area. All existing taxiways are 40 feet in width, which meets the FAA recommended design criteria minimum of a 35-foot width for the airport. Taxiway development in the Maximized Airport Development alternative for Scottsdale Airport consists of completion of the full-length parallel taxiway and construction of additional exit taxiways, including additional angled exit taxiways.

Navigational Aids/Lighting – Navigational aid improvements at Scottsdale Airport include development of a precision RNAV/GPS instrument approach and installation of an ALS, as identified in the "Navigational Aids and Aviation Services Special Study". Therefore, a MALS is included in the development alternative for Scottsdale Airport as well as an upgrade from the existing MIRL to HIRL, upon installation of the MALS.

Landside
Commercial Terminal Facilities - Scottsdale Airport enplaned approximately 5,000 passengers in the year 2000. The airport is projected to enplane approximately 118,000 passengers by the year 2025. This alternative includes construction of a new commercial passenger terminal as presented on the approved airport layout plan, to accommodate projected passenger activity.

Aircraft Storage – Scottsdale Airport had a total of 425 based aircraft in the year 2000. By the year 2025, the airport is projected to accommodate 48 additional based. An additional 4.8 acres of based aircraft storage space will be required during the study period. The approved airport layout plan includes space to accommodate the additional based aircraft facilities.

Sky Ranch Carefree
Airside

Airfield Capacity - Sky Ranch-Carefree Airport, a non-NPIAS facility, has an existing ASV of approximately 174,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 13,000 operations, or roughly 7.5 percent of the existing ASV. Additional airfield capacity should not be an issue at the airport during the course of the study period.

Runway Length/Width/Strength – The current Airport Reference Code for Sky Ranch-Carefree Airport is B-I, with an FAA recommended runway length of 4,400 feet and a runway width of 60 feet. The pavement strength recommended to accommodate a B-I ARC is 12,500 pounds, single wheel loading. Runway 6-24 is 4,437 feet long and 50 feet wide with a pavement strength of 12,500 pounds single wheel loading. The proximity of nearby roads, Pima Road off the Runway 24 end and Cave Creek Road off the Runway 6 end, prohibits any extension of the runway to provide additional length. However, this development alternative does include an overall widening of Runway 6-24 to 60 feet in width to meet FAA recommended design standards for a B-I ARC runway width.

Parallel Taxiway - Separation/Length/Width – A full-length parallel taxiway presently serves Runway 6-24. The present Runway 6-24 - taxiway separation at Sky Ranch-Carefree Airport is approximately 140 feet, which is less than the FAA recommended minimum for a B-II ARC of 150 feet where the facility is expected to serve small airplanes only. However, the previously identified widening of Runway 6-24 can be used to increase the runway - taxiway separation to 145 feet by placing the additional 10 feet of pavement on the west side of the runway. No additional taxiway development is proposed for the Sky Ranch-Carefree Airport.

Navigational Aids/Lighting – Sky Ranch-Carefree Airport currently does not have a visual approach guidance system. Installation of a VASI/PAPI system at the Airport is included as recommended in the "Navigational Aids and Aviation Services Special Study".

Landside

Aircraft Storage – Sky Ranch-Carefree Airport had a total of 84 based aircraft in the year 2000. By the year 2025, the Airport is projected to accommodate 146 additional based aircraft. Additional apron tiedown space and hangar facilities will be required to accommodate the projected increase in based aircraft during the study period. Adequate land is available to accommodate all of the required aircraft storage hangar facilities throughout the study period. A total of 14.6 additional acres of aircraft storage facilities are recommended for development at the Sky Ranch-Carefree Airport.

Stellar Airpark

Airside

Airfield Capacity - Stellar Airpark has an existing ASV of approximately 286,700 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 78,400 operations, or roughly 27 percent of the existing ASV. The airpark's role as a residential community precludes development of facilities to FAA design standards. Based on this information, additional airfield capacity is not required at the airport.

Runway Length/Width/Strength – Stellar Airpark is a non-NPIAS airport. Therefore, changes to the existing runway length, width, and strength are not included in this alternative for Stellar Airpark.

Parallel Taxiway - Separation/Length/Width – A full-length parallel taxiway is not available at the Stellar Airpark. The present Runway 17-35 - taxiway separation is approximately 150 feet. No additional taxiway development has been identified for this facility due to its non-NPIAS status.

Navigational Aids/Lighting – No navigational aids or lighting is proposed at the Stellar Airpark.

Landside

Aircraft Storage – Stellar Airpark had a total of 152 based aircraft in the year 2000. By the year 2025, the Airport is projected to accommodate 139 additional based aircraft. A total of 13.9 additional acres of aircraft storage facilities would be required to accommodate the additional projected based aircraft at the Stellar Airpark in the Maximized Airport Development alternative. A review of the existing airfield layout indicates that some portion of the projected additional based aircraft can be accommodated at this facility.

Wickenburg Municipal Airport

Airside

Airfield Capacity - Wickenburg Municipal Airport has an existing ASV of approximately 245,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 38,100 operations, or roughly 15.5 percent of the existing ASV. Based on this information, no additional airfield capacity development is proposed for the airport.

Runway Length/Width/Strength – The current Airport Reference Code for Wickenburg Municipal Airport is B-I, with an FAA recommended runway length of 4,300 feet and runway width of 60 feet. The pavement strength recommended to accommodate a B-I ARC is 12,500 pounds, single wheel loading. The airport Master Plan currently under development recommends an upgrade of the ARC to C-II, with a recommended ultimate Runway 5-23 length of 7,500 feet and ultimate runway width of 100 feet. The existing pavement strength of 16,000 pounds single wheel loading would need to be upgraded to 30,000 pounds single wheel loading to be compatible with the upgraded ARC as presented in the Master Plan. Recommended runway development included in the Maximized Airport Development alternative for Wickenburg Municipal Airport includes lengthening of the runway to an overall length of 7,500 feet and widening to a width of 100 feet. Existing and proposed pavements should be capable of accommodating 30,000 single wheel loading.

Parallel Taxiway - Separation/Length/Width – The present Runway 5-23 - taxiway separation at Wickenburg Municipal Airport is 200 feet. The recommended upgrade of the ARC to a C-II classification would result in a recommended Runway 5-23 - taxiway separation of 300 feet for a non-precision instrument runway and 400 feet for a precision instrument runway. Development of the existing Runway 5-23 to C-II will require relocating the existing parallel taxiway 100 feet outboard of the existing taxiway location. The relocated taxiway should be constructed at a width of 35 feet to meet C-II design criteria. Extension of the parallel taxiway in association with the future extension of Runway 5-23 to its ultimate 7,500-foot length is included in this alternative for Wickenburg Municipal Airport.

Navigational Aids/Lighting – Additional navigational aid improvements at Wickenburg Municipal Airport include development of a non-precision RNAV/GPS instrument approach and installation of REILs.

Landside

Aircraft Storage - Wickenburg Municipal Airport had a total of 31 based aircraft in the year 2000 and by the year 2025, the airport is projected to accommodate 29 additional based aircraft. Additional apron tiedown space and hangar facilities required to accommodate the projected increase in based aircraft will represent an additional 2.9 acres of based aircraft storage space during the planning period. The existing based aircraft tiedown apron and a number of existing aircraft storage hangars will be lost/relocated with the relocation of the parallel taxiway to meet the C-II ARC. A review of the existing airfield layout indicates that adequate land is available to accommodate the new and replacement aircraft storage facilities required to meet the projected demand throughout the study period. A total of 5.8 acres of aircraft storage space (including 2.9 acres of replacement space) are included in the development at the Wickenburg Municipal Airport.

Williams Gateway Airport
Airside
Airfield Capacity - Williams Gateway Airport has three parallel runways with an existing ASV of approximately 410,000 annual operations. The projected activity levels at the airport by the year 2025 will total approximately 420,300 operations, or almost 102.5 percent of the existing ASV. Development of additional airfield capacity at Williams Gateway is recommended during the study period, based on FAA criteria that recommend construction of additional airfield capacity when airport activity reaches 80 percent of ASV. Existing airfield capacity is constrained by the lack of a full-length parallel taxiway serving Runway 12C-30C and Runway 12L-30R.and adequate exit taxiways. Runway 12L-30R has a single midfield right-angled exit taxiway in addition to the exit taxiways located at each runway end, thereby degrading the runway exit rating. All existing exit taxiways serving the airport runways are right-angled exit taxiways, which further impedes airfield capacity. Additional airfield capacity can be achieved through the construction of angled exit taxiways to and from all runways. Existing Runway 12C-30C is shown as an interim runway that will be reconfigured as a parallel taxiway as shown on the approved airport layout plan. It is estimated that with the taxiway exit improvements, a measurable improvement in overall airfield capacity, increasing the ASV up to as much as 512,500, should result.

Runway Length/Width/Strength – The current Airport Reference Code for Williams Gateway Airport is D-V, with an FAA recommended runway length of 11,000 feet and runway width of 150 feet. The existing pavement strength can readily accommodate aircraft in the D-V ARC, which includes virtually all aircraft in the present commercial fleet. Runway 12L-30R is currently 9,300 feet in length and 150 feet in width. The airport layout plan incorporates an extension to Runway 12L-30R with an ultimate length of 12,500 feet while maintaining the present runway width of 150 feet.

Parallel Taxiway - Separation/Length/Width – The Runway 12R-30L - taxiway separation at Williams Gateway Airport is 780 feet, which substantially exceeds the FAA recommended minimum 400-foot separation for a D-V ARC. However, 12L-30R is the primary runway and this runway has no parallel taxiway, either full or partial. A full-length parallel taxiway to serve Runway 12L-30R is incorporated on the approved airport layout plan. This taxiway will meet the D-V runway – taxiway separation criteria. Runway 12C-30C is shown on the approved airport layout plan to be converted into another full-length parallel taxiway on the southwest side of Runway 12L-30R. Construction of a number of angled-exit taxiways is depicted on the approved airport layout plan for Williams Gateway Airport, providing high speed ingress and egress to/from both Runway 12R-30L and Runway 12L-30R. The taxiway development depicted on the approved airport layout plan is included in this airfield development alternative for the Williams Gateway Airport.

Navigational Aids/Lighting - Williams Gateway Airport currently has a precision instrument approach to Runway 12C. The "Navigational Aids and Aviation Services Special Study" indicated that installation of an ALS would be economically justified at the airport. Therefore, a MALS is recommended and has been included in the Maximized Airport Development alternative for Williams Gateway Airport. As recommended in the "Navigational Aids and Aviation Services Special Study", the existing MIRL will also be upgraded to HIRL, with installation of the MALS for the new primary runway (12L-30R).

Landside
Commercial Terminal Facilities - Williams Gateway Airport is projected to enplane approximately 250,000 passengers by the year 2005. An interim 24,000 square foot commercial passenger terminal has been constructed, which can accommodate up to 500,000 annual enplaned passengers. A total of four aircraft gates are provided. The airport is projected to enplane more than 3.3 million passengers by the year 2025. This alternative includes construction of a new 300,000 square foot commercial passenger terminal to accommodate projected passenger activity.

Aircraft Storage - Williams Gateway Airport had a total of 63 based aircraft in the year 2000. The airport is projected to accommodate 238 additional based aircraft by the year 2025. An additional 23.8 acres of based aircraft storage space will be required during the 2000-2025 time frame. There is more than adequate land available to accommodate all of the aircraft storage hangar facilities required to meet the projected demand throughout the study period within the existing airfield property. A total of 23.8 additional acres of aircraft storage facilities are recommended for development at the Williams Gateway Airport in the Maximized Airport Development alternative.

The Maximized Airport Development Alternative has shown that there are several airports in the MAG Region that appear capable of improving the Region's overall operational capacity through the development of parallel runways. Parallel runways are planned at several airports, but also appear feasible from a purely locational perspective at several other airports. **Table 4.6** depicts the existing and projected ASV figures for the airports assuming implementation of previously described runway and taxiway improvements that would result in increased operational capacity.

Table 4.6
MAG Facility Alternatives – Maximized Airport Development Alternative

Airport Name	Future ARC	2000 ASV	2025 ASV	2025 Operations	2025 Operations to ASV Ratio
Buckeye Municipal	C-II	315,560	315,560	215,200	68.2%
Chandler Municipal	C-II	460,000	529,000	514,500	97.3%
Estrella Sailport	A-I	120,000	120,000	16,500	13.8%
Gila Bend Municipal	B-II	212,797	212,797	57,800	27.2%
Glendale Municipal	C-II	257,972	257,972	197,000	76.4%
Memorial	C-III	100,000	240,000	5,500	2.3%
Mesa Falcon Field	B-II	443,000	510,000	472,100	92.6%
Phoenix-Deer Valley	D-II	606,000	650,000	640,600	98.6%
Phoenix – Goodyear	D-IV	304,916	470,000	334,200	71.1%
Phoenix-Sky Harbor International					
Scenario 1	D-V	137	144	174	120.8%
Scenario 2	D-V	146	164	214	130.5%
Pleasant Valley	B-I	120,000	230,000	134,300	58.4%
Scottsdale	D-II	200,000	225,000	262,600	116.7%
Sky Ranch Carefree	B-I	174,000	174,000	13,000	7.5%
Stellar Airpark	A-I	286,700	286,700	78,400	27.3%
Wickenburg Municipal	C-II	245,000	355,000	38,100	10.7%
Williams Gateway	D-V	410,000	512,500	420,300	82.0%
MAG		**4,255,945**	**5,088,529**	**3,400,100**	**66.8%**

Source: Wilbur Smith Associates

With proposed improvements in operational capacity at 10 of the system airports, operational capacity in the MAG Region is significantly reduced. While operational capacity would continue to be an issue at certain airports, the Region as a whole would benefit from the provision of additional operating capacity.

New Airport Development (General Aviation and/or Commercial Service)

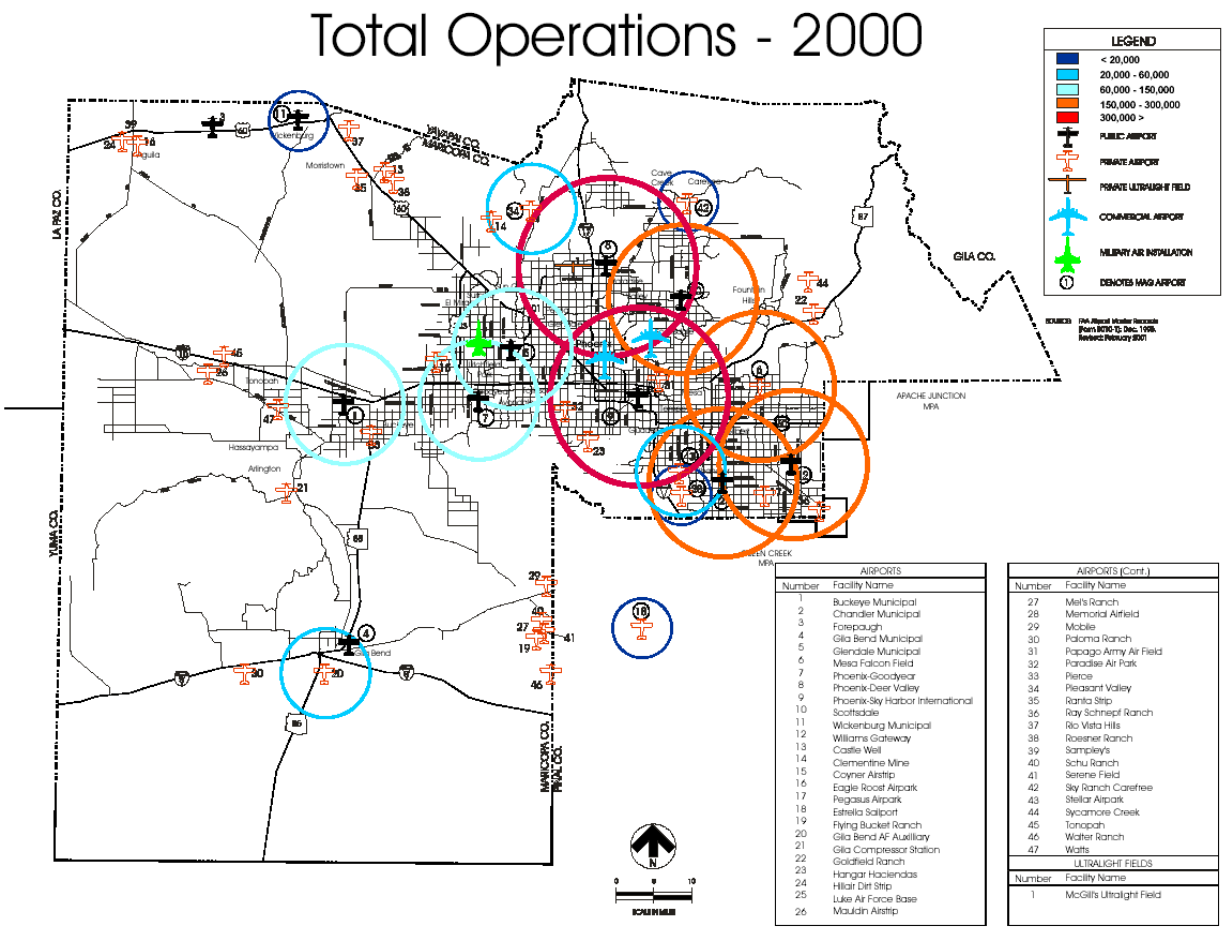
The fourth alternative scenario reviews previous study results for proposed new airports within the MAG Region, should no new runways be constructed at existing MAG system airports. A portion of the projected demand from other existing MAG system airports will be reassigned to any proposed new airport(s) in order to determine appropriate facility needs of existing airports with the construction of any new airport in the system.

The alternatives analysis is based on the projections of demand contained in Working Paper Number 2. Deviations from the projections, including slower than projected growth or higher than projected growth, will be evaluated after the recommended system has been identified as part of the sensitivity analysis.

This fourth alternatives scenario assumes no new runways would be constructed at existing system airports. A portion of the projected demand at existing MAG airports would therefore be reassigned to new airports. Projected excess system demand is in the range of 600,000 annual operations. An important consideration in the evaluation of any proposed new general aviation airport site would be a requirement to provide the ability to accommodate precision instrument training activity. This alternative focuses on previous studies that identified development of new airports in the MAG Region, as well as other potential areas where a new airport could be considered.

Figures 4.2 and **4.3** depict the base year 2000 and year 2025 operations levels at MAG System airports. These exhibits show the concentration of aircraft operations activity within the MAG System.

Figure 4.2
2000 Operational Concentrations

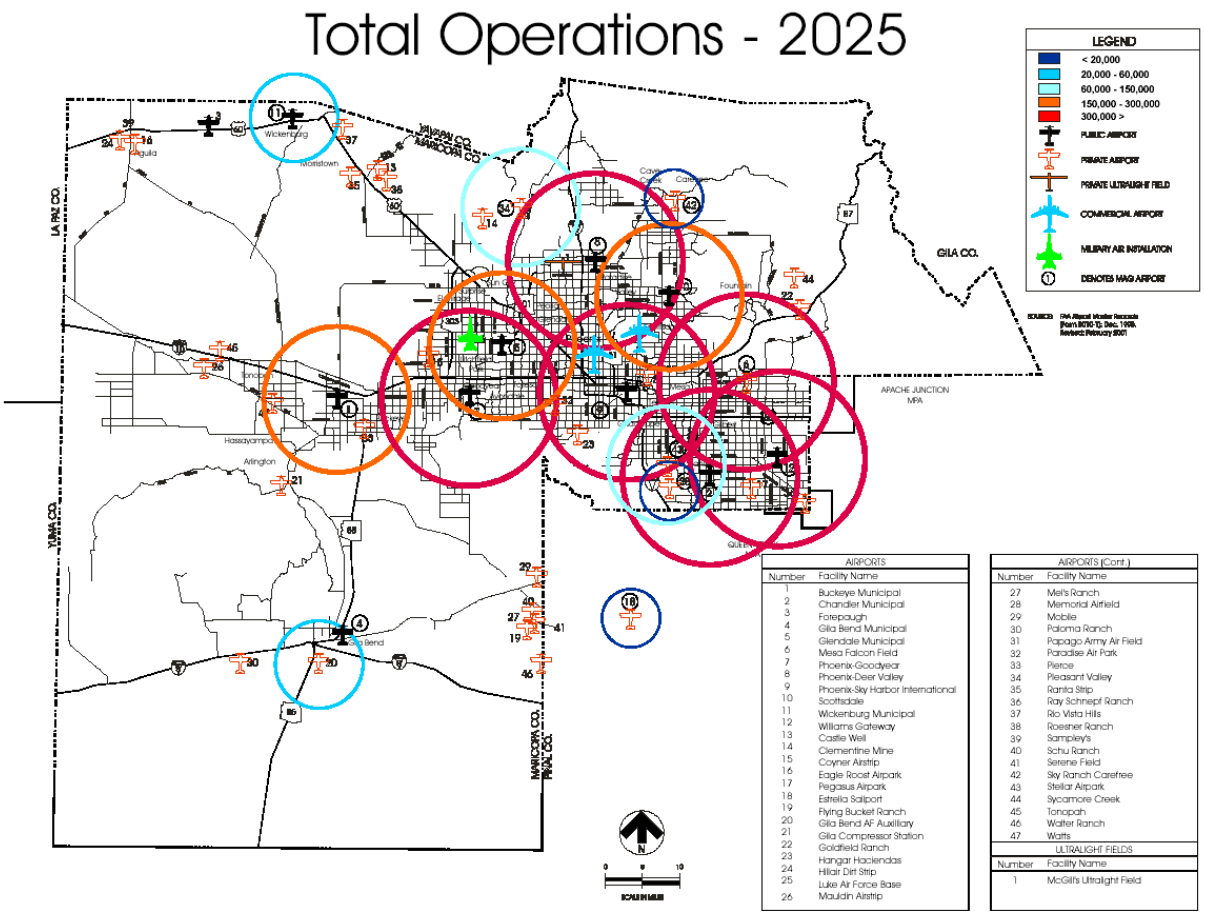


Source: Wilbur Smith Associates

The greatest concentration of aviation activity is focused on the east side of the MAG Region. Western and southern Maricopa County do not have significant levels of civilian general aviation activity. It should be noted that Luke Air Force Base is located in the western portion of the Phoenix metropolitan area and a concentration circle for Luke is not shown in these exhibits. Between 2000 and 2025, significant demand is projected for the airports along the I-10 corridor, with continued growth in eastern Maricopa County.

Studies to develop new airports have been prepared for the City of Peoria (Pleasant Valley) and for a new commercial service airport to supplement Phoenix-Sky Harbor International Airport. In addition, the City of Wickenburg is currently evaluating airport development options, which may include construction of a new airport. The existing studies will be evaluated initially. Should the evaluation of these facilities determine them to be inadequate or inappropriate to accommodate projected activity beyond that which can be readily accommodated by the existing system airports, additional new airport options will be assessed.

Figure 4.3
2025 Projected Operational Concentrations



Source: Wilbur Smith Associates

Assessment of Previous New General Aviation Airport Proposals

Over the years, new general aviation airports have been considered in several locations. The two most recent proposals are Peoria and Wickenburg. These proposals are discussed below.

City of Peoria - The proposed new airport that would serve aviation activity associated with the City of Peoria is located immediately north of the city, focused on the current Pleasant Valley Airport. This location lies somewhat outside the primary concentration of projected aviation activity within the MAG Region. This plan, as it was defined, would incorporate the existing Pleasant Valley Airport and expand on the facilities available there. A number of sites were originally evaluated. After further study, the existing Pleasant Valley Airport site was recommended in order to incorporate the activity and facility

investments already in place. Pleasant Valley Airport is a major sailplane base and the proposed new airport would incorporate those activities and provide expanded facilities to attract a broader range of general aviation uses including corporate activity.

The proposed facilities would be located on approximately 1,000 acres and include redevelopment of the existing Pleasant Valley Airport. The facility would provide three parallel runways. The paved runways would include a primary runway, initially 4,600 feet in length and ultimately 7,400 feet in length and 100 feet in width and a second parallel paved recreational runway 4,000 feet in length and 60 feet in width. A new 4,000-foot long by 120-foot wide unpaved runway would also be developed along with an unpaved 2,000-foot long by 120-foot wide crosswind runway.

A general aviation terminal area would be constructed to accommodate powered general aviation aircraft and a separate area would be developed to accommodate gliders and ultralights. As proposed, the facility could provide the potential to accommodate a substantial amount of aviation activity, both based aircraft and operations.

However, the proposed facility would be limited to nonprecision instrument approaches due to the potential interaction with Luke Air Force Base activity. In addition, the degree of recreational aircraft activity (gliders and ultralights) at this airport would tend to suggest that its use for aircraft training purposes might be inappropriate. Use of the proposed new Pleasant Valley Airport to off-load excess operations from other system airports could support the MAG system, but based on the lack of potential precision instrument approach capability and the incompatible aircraft types that would use this facility, this airport site could not fully meet the identified demand.

City of Wickenburg - The City of Wickenburg is currently developing an airport Master Plan to accommodate projected aviation activity over the next 20 years. This study has identified a number of options to accommodate projected activity, including development of the existing site and an option that focuses on development of a new airport complex at the Forepaugh site. A review of the documents related to the Wickenburg Airport Master Plan revealed that none of the proposed options include provision of a precision instrument approach capability.

The City of Wickenburg is located approximately 30 miles northwest of the Phoenix metropolitan area. This location lies farther outside the primary concentration of projected aviation activity within the MAG Region than the Pleasant Valley site. The potential exists to accommodate some excess system demand at the existing Wickenburg Municipal Airport as well as the Forepaugh site.

Identification of New General Aviation Airport Options

Aviation activity projections for the MAG Region cannot be accommodated within the existing airport system assuming the Status Quo alternative. As noted, previous studies have examined the potential for a new general aviation airport Forepaugh/Wickenburg and Peoria/Pleasant Valley. These sites will be carried over for analysis in a subsequent alternatives evaluation chapter. Development of these two sites would still not likely accommodate the needs identified in the MAG Region for instrument training activity and the ability to accommodate approximately 600,000 annual operations.

Given these conclusions, options to accommodate excess general aviation system demand within the Region through the development of new airports have been assessed in general terms. Two specific parameters were established to site potential new airports to accommodate excess general aviation system demand: Regional accessibility and precision instrument approach capability.

Any new airport should be located in reasonably close proximity to the core of MAG system activity to allow access and be of value within the system. In addition, the ability to provide precision instrument approach capability will provide the greatest benefit to the aviation community. This ability, by definition, would require a location distant from the Luke Air Force Base and the military traffic patterns associated with Luke's mission. Similarly, a location that distances this training activity from interaction with Phoenix-Sky Harbor International would be of equal importance.

A review of the MAG Region identified two specific areas where development of new general aviation airports capable of accommodating excess system demand could be feasible. The first area is located to the south/southeast, generally along the I-10 corridor. This area could be outside the MAG Region, but is a growing area of the Phoenix metroplex. Development of an airport south and likely east of Maricopa County could help to serve demand in Chandler and Mesa.

The second area is located to the northeast along Arizona Highway 87, the Bee Line Highway. This area would help to serve the continued growth in the east and north areas of Phoenix. A general aviation airport north and or east of Scottsdale would serve the significant level of demand generated in this Region.

General areas for these two airports are depicted on **Exhibit 4.3**, along with notations of the proposed Peoria/Pleasant Valley and Forepaugh/Wickenburg airports.

The level of excess system activity that should be provided for is in the range of 600,000 operations. This represents activity that would need to be accommodated should no major expansion to the existing airport system occur. For the purposes of this analysis, it has been assumed that each airport should be capable of accommodating approximately 300,000 operations and precision instrument approach capability by the end of the study period. Initially, each facility could be developed solely as an instrument training facility with a single runway, which could be upgraded later. Facilities should initially be designed to B-II design criteria (runway length of 4,200 - 4,400 feet and width of 75 feet) and ultimately upgraded to a C-II level (runway length of 6,000 - 7,500 feet and width of 100 feet).

The initial facilities could be constructed with precision instrument approach capabilities, for training activity and ultimately upgraded with a 35-foot wide, full-length parallel taxiway offset 400 feet from the runway centerline. Initial development as training facilities could be accomplished without the need for substantial landside development. Landside facilities, including aircraft parking aprons, T-hangars, general aviation terminal facilities, fueling facilities, vehicular parking, etc. could gradually be developed on-site, over the course of the study period. Ultimately, a second parallel runway and associated taxiway spaced a minimum of 700 feet between runway centerlines would be constructed to B-II design criteria. Total acreage required would range between 650 and 750 acres or more, depending on the ultimate role of these facilities.

Two new airports initially with a single runway, full-length parallel taxiway and adequate angled, exit taxiways and ultimately with two parallel runways and associated parallel taxiway systems would be capable of accommodating in excess of 450,000 operations. These facilities would provide the additional capacity necessary to meet excess system demands throughout the study period.

Assessment of New Commercial Service Airport Proposals

The City of Phoenix Aviation Department undertook a study to evaluate the feasibility of siting a potential new commercial airport. The initial phase of the study evaluated airspace feasibility, that is the feasibility of siting a new airport within the constraints of the existing airspace system. A study area was

established by the City of Phoenix, bounded by Highway 17 on the east, Beardsley Road on the south, the Wickenburg Mountains to the north, and the city of Wickenburg to the west.

Two key findings of the airspace feasibility study were: 1) if future commercial air service could only be accommodated by a new airport, airport sites outside the study area of the feasibility study should be considered and 2) coordination should be undertaken with Williams Gateway Airport to determine the role it could serve in accommodating future commercial air service needs.

A second study was undertaken by the Arizona Department of Transportation, which evaluated the feasibility of a regional airport between Tucson and Phoenix (Regional Airport Feasibility Assessment Study – RAFA). This study, completed in 1993, recommended a new regional airport be pursued. Three areas were identified as potential sites: Williams (was Air Force Base put on closure list at the time), Casa Grande, and Coolidge.

Identification of New Commercial Service Airport Options

There are two options are available to meet long-range commercial service needs, should no additional runways be developed at Phoenix-Sky Harbor International Airport and the need for operational capacity continues into the future. The first option would involve developing new and expanded terminal facilities at the Williams Gateway Airport to accommodate commercial demand that could not be accommodated at Phoenix-Sky Harbor International. The present airfield at Williams Gateway is capable of accommodating commercial service and a number of facilities are currently in place to do this. However, a significant portion of the projected general aviation demand at the Williams Gateway Airport would in all likelihood be displaced should a significant volume of commercial traffic be generated at Williams Gateway Airport. In that event, additional general aviation capacity would need to be identified within the MAG System, beyond what has been discussed previously.

The second option is the siting of a new commercial service airport to supplement Phoenix-Sky Harbor International Airport. As previously discussed, a new airport site was examined in the northern portions of the Region. Another study examined a new airport site south of Phoenix and even south of Maricopa County (Casa Grande and Coolidge). These two areas will be addressed in the alternatives analysis for the MAG RASP and are depicted in Exhibit 4.3.

A new commercial service airport would have to be capable of accommodating the demand beyond the current peak hour capacity of Phoenix-Sky Harbor International, which ranges between 137 and 146 operations per hour. The commercial activity projections for Phoenix-Sky Harbor International indicate an ultimate need to accommodate between 174 and 214 peak hour operations by the end of the study period. A new airport would therefore need to accommodate the difference between the existing airfield capacity at Phoenix-Sky Harbor International and the projected demand. A new airport would therefore need to have peak hour capacity ranging from 28 to 37 operations under Scenario One to 68 to 77 operations under Scenario Two.

A supplemental, new commercial service airport designed to accommodate this level of demand would be expected to handle only short to medium haul activity. Given that scenario, such a facility would be designed to a C-III ARC, which could accommodate all of the aircraft in the short to medium haul fleet, such as the Boeing B-717/737 and Airbus A-318/319/320 and all current and proposed regional jets. Such a facility would require a runway between 8,000 and 9,000 feet in length and 100 feet in width. The facility would also require a full-length parallel taxiway, 50 feet wide and 400 feet off the runway centerline. Precision instrument approach capability with appropriate runway taxiway and approach lighting would also be required. This configuration would be capable of accommodating in the range of 53 to 56 operations per hour, which would be acceptable for the low end of the activity range. A second

parallel runway and associated taxiway facilities separated by a minimum of 4,300 feet would be required to accommodate the high end of the projected commercial activity range.

Additional landside and support facilities would also be required, including a passenger terminal, vehicular parking facilities, and access and service roads. The acreage required for a supplemental commercial service airport could be expected to range between 2,500 and 3,500 acres.

Table 4.7 presents the existing and projected capacities of the MAG system airports assuming capacity improvements through new airport development.

Table 4.7
MAG Facility Alternatives – New Airport Development Alternative

Airport Name	2000 ASV	2000 ASV X 80%	2025 Operations	Capacity Needed @ 100% ASV	Capacity Needed @ 80% ASV
Buckeye Municipal	315,560	252,450	215,200	N.A.	N.A.
Chandler Municipal	460,000	368,000	514,500	N.A.	N.A.
Estrella Sailport	120,000	96,000	16,500	N.A.	N.A.
Gila Bend Municipal	212,797	170,238	57,800	N.A.	N.A.
Glendale Municipal	257,972	206,378	197,000	N.A.	N.A.
Memorial	100,000	80,000	5,500	N.A.	N.A.
Mesa Falcon Field	443,000	354,400	472,100	29,100	117,700
Phoenix-Deer Valley	606,000	484,800	640,600	34,600	155,800
Phoenix-Goodyear	304,916	243,933	334,200	29,284	90,267
Phoenix-Sky Harbor International					
Scenario 1	137	N.A.	174-214	37-77	N.A.
Scenario 2	146	N.A.	174-214	28-68	N.A.
Pleasant Valley	120,000	96,000	134,300	14,300	38,300
Scottsdale	200,000	160,000	262,600	62,600	102,600
Sky Ranch Carefree	174,000	139,200	13,000	N.A.	N.A.
Stellar Airpark	286,700	229,360	78,400	N.A.	N.A.
Wickenburg Municipal	245,000	196,000	38,100	N.A.	N.A.
Williams Gateway	410,000	328,000	420,300	10,300	92,300
MAG				**180,184**	**596,967**
New GA Airport A	450,000	360,000	298,480	298,480	373,100
New GA Airport B	450,000	360,000	298,480	298,480	373,100
New Commercial Service Airport					
Operations per hour	53-111	N.A.	28-77	28-77	N.A.

Source: Wilbur Smith Associates

SUMMARY

The four alternatives discussed in this Working Paper form the basis for future evaluation. The feasibility of these alternatives will be compared in a subsequent working paper. It is important to note that while presented as separate alternatives, a hybrid or combination of the alternatives will likely be considered at the conclusion of the evaluation.